PB90-263872

Fate of Trace Metals in a Rotary Kiln Incinerator with a Venturi/Packed Column Scrubber. Volume 2. Appendices

Acurex Corp., Mountain View, CA

Prepared for:

Environmental Protection Agency, Cincinnati, OH

Sep 90

U.S. Department of Commerce
National Technical Information Service
NTIS

PB90-263872

EPA/600/2-90/043b
September 1990

THE FATE OF TRACE METALS IN A ROTARY KILN INCINERATOR WITH A VENTURI/PACKED COLUMN SCRUBBER

Volume II — Appendices

By
D. J. Fournier, Jr., W. E. Whitworth, Jr., J. W. Lee, and L. R. Waterland
Acurex Corporation
Environmental Systems Division
Incineration Research Facility
Jefferson, Arkansas 72079

EPA Contract No. 68-03-3267
Work Assignments 2-1 and 3-1

EPA Project Officer: Robert C. Thurnau
Technical Task Manager: Gregory J. Carroll
Waste Minimization, Destruction and Disposal Research Division
Risk Reduction Engineering Laboratory
Cincinnati, Ohio 45268

RISK REDUCTION ENGINEERING LABORATORY
OFFICE OF RESEARCH AND DEVELOPMENT
U.S. ENVIRONMENTAL PROTECTION AGENCY
CINCINNATI, OHIO 45268

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U.S. DEPARTMENT OF COMMERCE
NATIONAL TECHNICAL
INFORMATION SERVICE
SPRINGFIELD, VA 22161

TECHNICAL REPORT DATA

(Please read Instructions on the reverse before comple

1. REPORT NO. EPA/600/2-90/043b

2.

3. PB90-263872

4. TITLE AND SUBTITLE
The Fate of Trace Metals in a Rotary Kiln Incinerator with a Venturi/Packed Column Scrubber - Volume II: Appendices

5. REPORT DATE September 1990

6. PERFORMING ORGANIZATION CODE

7. AUTHOR(S)
D.J. Fournier, Jr., W.E. Whitworth, Jr.,
J.W. Lee, and L.R. Waterland

8. PERFORMING ORGANIZATION REPORT NO.

9. PERFORMING ORGANIZATION NAME AND ADDRESS
Acurex Corporation
485 Clyde Avenue
Mountain View, CA 94039

10. PROGRAM ELEMENT NO.

11. CONTRACT/GRANT NO.
68-03-3267

12. SPONSORING AGENCY NAME AND ADDRESS
Risk Reduction Engineering Laboratory--Cincinnati, OH
Office of Research and Development
U.S. Environmental Protection Agency
Cincinnati, OH 45268

13. TYPE OF REPORT AND PERIOD COVERED
Final - 1988

14. SPONSORING AGENCY CODE
EPA/600/14

15. SUPPLEMENTARY NOTES
Gregory J. Carroll, TPM FTS Phone No. 684-7948 Commercial Phone No. 513/569-7948

16. ABSTRACT

A five week series of pilot-scale incineration tests, using a synthetic waste feed, was performed at EPA's Incineration Research Facility to evaluate the fate of trace metals fed to a rotary kiln incinerator. Eight tests studied the fate of five hazardous constituent and four nonhazardous constituent trace metals as a function of incinerator operating temperatures and feed chlorine content. Three tests evaluated the valance state of chromium in emissions and discharges as a function of feed valance state and feed chlorine content.

Parametric tests confirmed that cadmium, lead and bismuth are relatively volatile, based on normalized discharge distribution data. Barium, copper, strontium, chromium and magnesium are relatively nonvolatile. Apparent scrubber efficiencies generally correlated with observed volatilities; collection efficiency was higher for nonvolatile metals than for volatile metals. Increased feed chlorine content significantly increased the volatility of cadmium, lead and bismuth.

Chromium test results indicated that with no feed chlorine, 95 percent of the measured chromium is discharged in the kiln ash. With chlorine in the feed, this fraction dropped to 85 percent. Kiln ash contained negligible hexavalent chromium [Cr(+6)] for all tests. The fraction of scrubber exit flue gas chromium as Cr(+6) was nominally 15 percent with no feed chlorine, increasing to 50 percent with chlorine-containing feed.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group

18. DISTRIBUTION STATEMENT
RELEASE TO PUBLIC

19. SECURITY CLASS (This Report)
UNCLASSIFIED

20. SECURITY CLASS (This page)
UNCLASSIFIED

21. NO. OF PAGES
240

22. PRICE

DISCLAIMER

The information in this document has been funded by the U.S. Environmental Protection Agency under Contract No. 68-03-3267. It has been subjected to the Agency's peer review and administrative review, and it has been approved for publication as an EPA document. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

FOREWORD

Today's rapidly developing and changing technologies and industrial products and practices frequently carry with them the increased generation of materials that, if improperly dealt with, can threaten both public health and the environment. The U.S. Environmental Protection Agency is charged by Congress with protecting the Nation's land, air, and water resources. Under a mandate of national environmental laws, the agency strives to formulate and implement actions leading to a compatible balance between human activities and the ability of natural systems to support and nurture life. These laws direct the EPA to perform research to define our environmental problems, measure the impacts, and search for solutions.

The Risk Reduction Engineering Laboratory is responsible for planning, implementing, and managing research, development, and demonstration programs to provide an authoritative, defensible, engineering basis in support of the policies, programs, and regulations of the EPA with respect to drinking water, wastewater, pesticides, toxic substances, solid and hazardous wastes, and Superfund-related activities. This publication is one of the products of that research and provides a vital communication link between the researcher and the user community.

This report describes an extensive series of tests conducted at the EPA's Incineration Research Facility to evaluate the fate of trace metals fed to a rotary kiln incinerator. For further information, please contact the Waste Minimization, Destruction and Disposal Research Division of the Risk Reduction Engineering Laboratory.

E. Timothy Oppelt, Director
Risk Reduction Engineering Laboratory

ABSTRACT

A 5-week series of pilot-scale incineration tests, employing a synthetic waste feed, was performed at the U.S. Environmental Protection Agency's (EPA) Incineration Research Facility (IRF) to evaluate the fate of trace metals fed to a rotary kiln incinerator equipped with a venturi scrubber/packed column scrubber. Completed were three tests to evaluate the valence state of chromium in emissions and discharges as a function of valence state in the feed and feed chlorine content, and eight tests to evaluate the fate of five hazardous constituent and four nonhazardous constituent trace metals as a function of incinerator operating temperatures and feed chlorine content. this volume contains the appendices, titled → p.v —

Chromium test results indicated that when no chlorine was present in the feed, 95 percent of the measured chromium was discharged in the kiln ash, 1 to 2 percent in the scrubber exit flue gas, and 3 percent in the scrubber liquor. With chlorine in the feed, these fractions were 84, 4, and 11 percent, respectively. Kiln ash contained negligible Cr(+6) for all tests. Scrubber exit flue gas Cr(+6) as a fraction of total chromium was nominally 15 percent with no feed chlorine, increasing to about 50 percent with chlorine-containing feed. The scrubber liquor Cr(+6) fraction was 20 to 30 percent with Cr(+3) feed, increasing to about 60 percent with Cr(+6) feed.

Parametric trace metal test results confirm that cadmium, lead, and bismuth are relatively volatile metals, based on normalized discharge distribution data. Less than 32 percent of these metals were discharged in the kiln ash. Barium, copper, strontium, chromium, and magnesium are relatively nonvolatile, with greater than 75 percent of their discharge amounts present in kiln ash. Surprisingly, arsenic was found to be relatively nonvolatile. Apparent scrubber collection efficiencies generally correlated with observed volatility. Volatile metals exhibited collection efficiencies of 36 to 45 percent; nonvolatile metals, with the exception of copper, exhibited collection efficiencies of 49 to 88 percent. Feed chlorine content had a major effect on the observed volatility of cadmium, lead, and bismuth, with volatility increasing with increased feed chlorine content. Afterburner exit flue gas particle size distributions shifted to smaller size when chlorine was added to the feed.

The average mass balance closures around the kiln ash/scrubber discharge ranged from 48 to 96 percent for individual metals. Overall average closure was 71 percent. From past experience, trace metals mass balance closure results for combustion sources are in the 30 to 200 percent range.

This report was submitted in fulfillment of Contract Number 68-03-3267 by Acurex Corporation under the sponsorship of the U.S. Environmental Protection Agency. This report covers work conducted during August and September, 1988.

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APPENDIX A

INCINERATOR OPERATING DATA

Test 5
8-25-88

Time	Clay Feed Weight Reading (lbs)	Metals Feed Weight Reading (lbs)	Feed Metals Rotameter	Kiln Exit Temp (°F)	Kiln Gas Flow (scfh)	Kiln Air Flow (scfh)	AB Exit Temp (°F)	AB Gas Flow (scfh)	AB Air Flow (scfh)	Make-up Water Cum. (gal)	Blowdown Water (gpm)	Venturi Flow (gpm)	Venturi Pressure (°wc)	Packed Column Flow (gpm)	Packed Column Pressure (°wc)	Liquor pH	Liquor Temp (°F)	ID Fan Inlet (°wc)
1045	321.0	15.4	0	1553	450	12850	1943	630	19060	7933	0.7	18	23.0	31	1.0	6.92	162	22.0
1100	310.0	15.2	0	1416	260	6470	1937	630	19060	8003	0.7	18	23.0	31	1.3	6.60	163	22.0
1115	275.5	14.6	11	1436	210	6180	1944	630	19060	8060	0.7	18	22.0	31	2.0	7.69	164	22.0
1130	240.5	13.9	11	1426	210	6230	1946	630	19060	8121	0.7	18	22.0	31	2.0	7.53	164	22.0
1145	205.5	13.4	11	1480	220	6440	1941	630	19060	8188	0.7	18	22.0	31	2.0	6.00	163	22.0
1200	171.0	13.0	11	1481	220	6470	1937	630	19060	8237	0.7	18	22.0	31	2.0	3.30	164	22.0
1215	170.0	12.5	11	1979	210	6410	1936	630	19060	8303	0.7	18	22.0	30	2.5	6.60	164	22.5
1230	326.0	12.0	11	1488	220	6410	1937	630	19060	8363	0.6	18	22.0	30	2.5	6.70	164	22.5
1245	291.5	11.5	11	1506	220	6470	1967	630	19060	8419	0.6	18	22.0	30	2.5	7.20	164	22.5
1300	259.5	10.9	11	1510	200	5990	1950	630	19060	8414	0.6	17	21.5	30	2.5	5.40	164	22.0
1315	223.0	10.3	11	1512	210	6180	1951	630	19060	8527	0.6	17	21.5	30	2.5	8.30	165	22.0
1330	188.5	9.8	11	1541	200	5600	1954	630	19060	8596	0.5	18	21.0	30	2.5	7.40	166	22.0
1345	154.0	9.3	11	1548	190	5410	1958	630	19060	8653	0.5	18	21.0	30	3.0	6.90	166	22.0
1400	361.0	8.9	11	1543	170	5050	1964	630	19060	8707	0.5	18	21.0	30	3.0	8.80	166	22.0
1415	324.5	8.4	11	1522	180	5050	1965	630	19060	8767	0.5	18	21.0	30	3.5	8.50	167	22.0
1430	289.5	8.0	11	1509	170	5050	1964	630	19060	8828	0.5	18	21.0	31	3.5	4.45	164	22.0
1445	255.0	7.7	11	1509	170	5220	1964	630	19060	8884	0.5	18	21.0	30	4.0	5.40	164	22.0
1500	220.0	7.4	11	1485	180	5280	1963	630	19060	8743	0.5	18	21.0	30	4.0	7.10	164	22.0
1515	186.0	7.4	11	1515	200	5760	1961	630	19060	9002	0.5	18	20.0	30	4.0	6.96	164	22.0
1530	150.5	7.4	11	1528	190	5280	1966	630	19060	9057	0.5	18	20.0	32	4.0	7.17	164	22.0
1545	115.0	7.1	11	1533	180	5280	1970	630	19060	9120	0.5	18	20.0	30	4.5	6.78	164	22.0
1600	80.0	6.7	11	1536	180	5310	1974	630	19060	9172	0.5	18	20.0	30	4.5	7.34	164	22.0
1615	118.0	6.1	11	1523	170	4810	1979	630	19060	9230	0.5	18	20.0	30	4.5	8.02	164	22.0
1630	82.5	5.7	11	1528	170	5050	1979	630	19060	9289	0.5	18	20.0	30	4.5	6.01	164	22.0
1645	67.5	5.3	0	1512	310	12140	1961	630	19060	9344	0.5	18	19.0	30	5.0	6.82	164	23.0
Avg:	215.4	9.9	9.7	1524.0	211.6	6255.6	1956.4	630.0	19060.0	8630.4	0.6	17.9	21.2	30.4	3.1	6.83	164.2	22.1
Min:	67.5	5.3	0.0	1416.0	170.0	4810.0	1936.0	630.0	19060.0	7933.0	0.5	17.0	19.0	30.0	1.0	3.30	162.0	22.0
Max:	361.0	15.4	11.0	1979.0	450.0	12850.0	1979.0	630.0	19060.0	9344.0	0.7	18.0	23.0	32.0	5.0	8.80	167.0	23.0

Test 5
8-25-88

	Kiln Pressure ("wc)	AB Pressure ("wc)	Quench Water Flow (gpm)	AB Exit O2 (%)	AB Exit CO (ppm)	AB Exit CO2 (%)	AB Exit UTHC (ppm)	Kiln Exit O2 (%)	Scrubber Exit CO (ppm)	Scrubber Exit CO2 (%)	Scrubber Exit NOx (ppm)	Scrubber Exit HTHC (ppm)	Scrubber Exit UTHC (ppm)	Stack O2 (%)	Stack CO (ppm)	Stack CO2 (%)	Stack HTHC (ppm, CH4)
	0.040	0.20	12	8.3	0.0	7.6	-0.3	10.9	0.0	5.3	0.0	2.9	-0.4	11.8	0.0	0.0	0.6
	0.030	0.20	12	8.9	0.0	7.7	-0.2	13.2	0.0	5.7	0.0	0.4	0.2	11.9	0.0	0.0	0.5
	0.030	0.20	12	8.3	0.0	8.4	-0.1	11.8	0.0	5.5	44.0	0.6	0.0	11.8	0.0	0.0	0.5
	0.030	0.20	12	8.6	0.0	8.2	0.3	11.7	0.0	5.8	47.0	0.8	0.2	11.8	0.0	0.0	0.2
	0.020	0.08	12	8.0	0.0	8.6	0.4	10.7	0.0	5.8	37.0	0.2	0.9	11.9	0.0	0.0	1.1
	0.025	0.18	12	8.4	0.0	7.8	0.9	11.5	0.0	5.4	46.0	0.4	0.2	11.9	0.0	0.0	0.4
	0.035	0.20	12	8.7	0.0	7.7	0.7	11.7	0.0	5.7	46.0	0.9	1.0	11.9	0.0	0.0	1.0
	0.030	0.18	12	9.0	0.0	7.9	0.8	11.7	0.0	5.6	47.0	-0.2	0.2	11.8	0.0	0.0	0.5
	0.035	0.14	12	8.7	0.0	7.9	0.9	11.6	0.0	5.7	51.0	-1.1	0.2	11.7	0.0	0.0	0.8
	0.035	0.18	12	9.2	0.0	7.2	0.9	11.5	0.0	5.4	49.0	0.0	0.0	12.0	0.0	0.0	0.1
	0.035	0.16	12	9.1	0.0	7.4	0.6	11.8	0.0	5.6	52.0	-0.3	0.2	11.7	0.0	0.0	0.2
	0.030	0.16	12	9.6	0.0	7.1	0.4	11.2	0.0	5.3	48.0	-0.2	0.3	12.1	0.0	0.0	0.8
	0.030	0.16	12	9.9	0.0	7.0	1.2	11.4	0.0	5.3	50.0	-0.3	0.2	12.2	0.0	0.0	0.8
	0.030	0.16	12	12.3	0.0	5.2	7.9	11.6	6.0	5.2	50.0	-0.1	0.6	12.3	0.0	0.0	0.2
	0.030	0.16	12	12.9	0.0	4.9	3.7	11.8	0.0	5.4	48.0	-0.6	0.4	12.2	0.0	0.0	0.7
	0.030	0.16	12	13.6	0.0	5.7	2.8	12.5	0.0	5.6	49.0	-0.6	0.2	12.1	0.0	0.0	0.6
	0.030	0.16	12	7.9	0.0	8.6	1.9	12.4	0.0	5.4	47.0	-0.8	0.4	12.1	0.0	0.0	0.7
	0.030	0.16	12	7.8	0.0	8.4	1.8	12.3	0.0	5.3	46.0	-1.9	0.3	12.2	0.0	0.0	0.2
	0.035	0.16	12	7.8	0.0	8.4	2.0	12.0	0.0	5.3	41.0	-0.6	0.5	12.2	0.0	0.0	0.4
	0.035	0.16	12	7.7	0.0	8.3	1.2	12.0	0.0	5.4	45.0	-0.1	0.2	12.3	0.0	0.0	0.5
	0.040	0.16	12	7.5	0.0	8.8	1.1	12.1	0.0	5.1	43.0	-2.2	-0.1	13.4	0.0	0.0	0.7
	0.040	0.16	12	7.6	0.0	8.6	1.6	12.0	0.0	5.7	54.0	-1.2	0.7	11.9	0.0	0.0	0.6
	0.040	0.16	12	7.7	0.0	8.3	1.9	12.4	0.0	5.8	55.0	-0.9	0.0	12.1	0.0	0.0	0.9
	0.040	0.16	12	7.8	0.0	8.3	1.6	12.3	0.0	5.9	54.0	1.9	0.1	12.1	0.0	0.0	0.3
	0.050	0.16	13	5.1	0.0	7.6	1.6	14.4	0.0	5.0	51.0	-1.8	0.3	12.5	0.0	0.0	0.1
Avg:	0.033	0.17	12.0	8.8	0.0	7.7	1.4	11.9	0.0	5.5	44.0	-0.2	0.3	12.1	0.0	0.0	0.5
Min:	0.020	0.08	12.0	5.1	0.0	4.9	-0.3	10.7	0.0	5.0	0.0	-2.2	-0.4	11.7	0.0	0.0	0.1
Max:	0.050	0.20	13.0	13.6	0.0	8.8	7.9	14.4	0.0	5.9	55.0	2.9	1.0	13.4	0.0	0.0	1.1

Test 7
8-30-88

Time	Clay Feed Weight Reading (lbs)	Metals Feed Weight Reading (lbs)	Feed Metals Rotometer	Kiln Exit Temp (°F)	Kiln Gas Flow (scfh)	Kiln Air Flow (scfh)	AB Exit Temp (°F)	AB Gas Flow (scfh)	AB Air Flow (scfh)	Make-up Water Cum. (gal)	Blowdown Water (gpm)	Venturi Flow (gpm)	Venturi Pressure ("wc)	Packed Column Flow (gpm)	Packed Column Pressure ("wc)	Liquor pH	Liquor Temp (°F)	ID Fan Inlet ("wc)
930	387.5	18.9	0	1597	410	14740	2004	610	19060	5472	1.5	19	10.0	30	13.0	7.14	163	21.0
945	387.5	18.9	0	1587	330	12140	1997	610	19060	5549	1.5	19	28.0	30	10.5	7.09	163	35.0
1000	387.5	18.8	0	1462	380	14030	1911	630	19060	5615	1.5	19	28.0	30	10.5	7.06	161	35.0
1015	387.5	18.7	0	1583	430	15450	1995	630	19060	5687	1.5	19	28.0	30	10.5	6.98	163	35.0
1030	387.5	18.7	0	1599	420	14850	1994	600	19060	5759	0.6	19	24.0	30	13.0	7.10	162	34.0
1045	363.5	18.5	11	1606	290	10250	2004	630	19060	5816	0.5	19	23.0	30	14.5	7.11	165	33.0
1100	328.5	18.1	11	1600	260	9300	1998	630	19060	5878	0.5	19	23.0	30	14.0	6.35	165	33.0
1115	293.0	17.8	11	1613	270	9540	1985	630	19060	5942	0.4	14	23.0	30	13.5	7.97	165	33.0
1130	250.5	17.3	11	1604	260	9090	1982	630	19060	6005	0.4	18	23.0	29	14.0	8.94	165	33.0
1145	220.5	16.9	11	1605	260	9800	1984	630	19060	6069	0.4	18	22.0	29	13.5	7.70	165	32.0
1200	188.5	16.6	11	1605	260	9070	1984	630	19060	6130	0.4	18	22.0	29	13.0	8.29	165	33.0
1215	152.0	16.1	11	1621	260	9300	1992	630	19060	6194	0.4	18	22.0	29	12.0	6.02	166	31.0
1230	119.0	15.7	11	1610	240	8830	1996	630	19060	6247	0.4	18	22.0	29	12.0	7.14	166	31.0
1245	84.5	15.3	11	1614	240	8590	1896	630	19060	6308	0.4	18	22.0	29	11.5	7.04	165	31.0
1300	376.5	14.7	11	1607	230	8590	1993	630	19060	6380	0.4	18	23.0	29	12.5	7.42	165	31.0
1315	341.5	14.2	11	1613	240	8570	1992	630	19060	6443	0.4	18	23.0	29	12.0	6.76	165	31.0
1330	306.5	13.7	11	1618	240	8590	1992	630	19060	6506	0.4	18	22.0	29	12.0	7.04	165	31.0
1345	271.5	13.2	11	1620	250	8810	1993	630	19060	6565	0.4	18	22.0	29	12.0	6.66	165	31.0
1400	236.0	12.8	11	1619	240	8320	1995	630	19060	6628	0.4	18	23.0	29	12.5	7.29	161	31.0
1415	201.0	12.3	11	1608	230	8120	1994	630	19060	6690	0.4	18	23.0	29	12.0	7.07	165	31.0
1430	166.0	11.9	11	1616	230	8120	1994	630	19060	6749	0.4	18	23.0	29	11.5	7.16	165	31.0
1445	130.0	11.5	11	1619	230	8120	1993	630	19060	6814	0.4	18	23.0	29	12.0	7.20	165	31.0
1500	125.0	11.6	0	1563	350	12220	1976	630	19060	6871	0.4	18	23.0	29	11.5	7.15	164	31.0
Avg:	265.5	15.7	8.1	1599.5	284.0	10193.0	1984.5	627.0	19060.0	6187.6	0.6	18.1	22.8	29.3	12.3	7.21	164.3	31.7
Min:	84.5	11.5	0.0	1462.0	230.0	8120.0	1896.0	600.0	19060.0	5472.0	0.4	14.0	10.0	29.0	10.5	6.02	161.0	21.0
Max:	387.5	18.9	11.0	1621.0	430.0	15450.0	2004.0	630.0	19060.0	6871.0	1.5	19.0	28.0	30.0	14.5	8.94	166.0	35.0

Test 7
8-30-88

	Kiln Pressure ("wc)	AB Pressure ("wc)	Quench Water Flow (gpm)	AB Exit O2 (%)	AB Exit CO (ppm)	AB Exit CO2 (%)	AB Exit UTHC (ppm)	Kiln Exit O2 (%)	Scrubber Exit CO (ppm)	Scrubber Exit CO2 (%)	Scrubber Exit NOx (ppm)	Scrubber Exit HTHC (ppm)	Scrubber Exit UTHC (ppm)	Stack O2 (%)	Stack CO (ppm)	Stack CO2 (%)	Stack HTHC (ppm, CH4)
	0.020	0.20	12	8.5	0.0	7.5	2.0	13.3	0.0	5.3	46.0	0.4	2.4	12.3	34.0	7.9	0.2
	0.020	0.20	12	9.0	0.0	7.2	0.1	12.6	0.0	4.9	49.0	0.3	2.5	12.8	31.0	7.7	0.1
	0.040	0.20	12	8.7	0.0	7.4	0.4	14.8	0.0	0.2	49.0	0.9	2.5	12.4	20.0	7.5	0.4
	0.040	0.20	12	8.0	0.0	7.9	0.2	13.0	0.0	5.3	49.0	0.3	2.2	12.1	28.0	8.2	0.2
	0.020	0.20	12	8.4	0.0	7.6	0.0	13.0	0.0	5.3	46.0	0.1	1.9	12.3	0.0	8.5	-0.7
	0.030	0.22	12	7.5	0.0	8.7	0.2	11.2	0.0	6.0	51.0	-0.2	2.2	11.7	17.0	9.1	0.2
	0.030	0.00	12	8.0	0.0	8.2	0.3	12.0	0.0	6.0	49.0	-0.1	1.9	11.9	23.0	7.8	-0.2
	0.030	0.22	12	7.6	0.0	8.9	0.7	12.0	0.0	6.1	51.0	32.5	2.0	11.6	0.0	8.6	-0.2
	0.030	0.22	12	7.7	0.0	8.6	0.9	12.5	0.0	5.8	54.0	2.5	1.9	12.2	14.0	8.0	-0.3
	0.020	0.22	12	7.9	0.0	8.4	0.5	12.8	0.0	5.6	49.0	0.2	1.7	12.1	0.0	7.8	0.5
	0.035	0.22	12	8.1	0.0	8.3	0.7	13.4	0.0	5.9	53.0	0.7	1.7	12.1	0.0	8.0	-0.3
	0.030	0.22	12	7.6	0.0	8.7	0.6	15.8	0.0	4.9	45.0	-0.2	2.3	13.7	0.0	7.4	0.3
	0.030	0.22	12	7.5	0.0	8.6	0.7	14.6	0.0	4.9	46.0	-0.3	2.1	13.7	0.0	7.4	0.2
	0.030	0.22	12	7.8	0.0	8.7	5.2	20.8	0.0	5.0	45.0	0.7	3.0	13.8	0.0	6.7	0.4
	0.030	0.22	12	7.8	0.0	8.4	1.7	12.1	0.0	5.5	52.0	-0.2	2.7	12.5	2.0	5.6	-0.2
	0.030	0.22	12	8.0	1.0	8.4	0.9	11.8	2.0	5.7	51.0	1.5	2.0	12.6	2.0	8.3	-0.2
	0.030	0.22	12	7.8	0.0	8.4	0.6	11.4	2.0	5.6	52.0	0.0	1.8	12.5	0.0	7.9	0.0
	0.030	0.22	12	7.9	0.0	8.5	0.8	12.1	0.0	5.7	53.0	0.2	1.9	12.4	0.0	7.5	0.5
	0.035	0.22	12	7.7	0.0	8.4	0.7	12.3	0.0	5.5	53.0	-0.1	1.7	12.8	0.0	7.4	-0.2
	0.035	0.22	12	7.9	0.0	8.2	0.9	12.5	0.0	5.7	51.0	0.0	1.8	12.5	0.0	7.8	-0.1
	0.035	0.22	12	7.9	0.0	8.5	-1.0	12.4	0.0	5.8	52.0	0.0	2.0	12.4	0.0	7.4	-0.2
	0.030	0.22	12	7.8	0.0	8.4	1.5	12.3	0.0	5.7	51.0	-0.5	1.7	12.4	0.0	7.0	0.0
	0.040	0.22	12	9.4	0.0	7.1	4.5	14.5	0.0	4.9	54.0	-0.6	1.9	13.1	0.0	6.8	0.6
Avg:	0.030	0.21	12.0	8.0	0.0	8.2	1.0	13.2	0.2	5.3	50.0	1.6	2.1	12.5	7.4	7.7	0.0
Min:	0.020	0.00	12.0	7.5	0.0	7.1	-1.0	11.2	0.0	0.2	45.0	-0.7	1.7	11.6	0.0	5.6	-0.7
Max:	0.040	0.22	12.0	9.4	1.0	8.9	5.2	20.8	2.0	6.1	54.0	32.5	3.0	13.8	34.0	9.1	0.6

Test 8
9-7-88

Time	Clay Feed Weight Reading (lbs)	Metals Feed Weight Reading (lbs)	Feed Metals Rotameter	Kiln Exit Temp (°F)	Kiln Gas Flow (scfh)	Kiln Air Flow (scfh)	AB Exit Temp (°F)	AB Gas Flow (scfh)	AB Air Flow (scfh)	Make-up Water Cum. (gal)	Blowdown Water (gpm)	Venturi Flow (gpm)	Venturi Pressure ("wc)	Packed Column Flow (gpm)	Packed Column Pressure ("wc)	Liquor pH	Liquor Temp (°F)	ID Fan Inlet ("wc)
1030	367.0	17.8	0	1682	590	15900	2200	630	16240	1362	2.5	18	21.0	30	13.0	7.24	166	32.0
1045	366.0	17.8	0	1568	370	9980	2190	630	16250	1446	0.5	18	21.0	30	13.0	7.12	167	32.0
1100	332.5	17.4	11	1614	320	8390	2194	630	16260	1513	0.5	18	21.0	30	13.5	7.18	167	32.0
1115	297.0	17.0	11	1609	320	8350	2192	630	16200	1581	0.5	18	21.0	30	13.5	8.12	167	32.0
1130	263.5	16.8	11	1605	310	8120	2166	630	16200	1646	0.5	18	21.0	30	14.0	6.18	168	32.0
1145	228.5	16.6	11	1593	300	8160	2148	630	16210	1712	0.5	18	21.0	30	13.8	7.13	167	32.0
1200	195.0	16.3	11	1579	330	8890	2159	630	15900	1778	0.5	18	21.0	30	14.0	7.12	167	32.0
1215	302.0	16.0	11	1593	350	9420	2170	630	15890	1842	0.4	18	20.0	30	14.0	7.12	167	32.0
1230	355.0	15.8	11	1597	340	9170	2175	630	15880	1906	0.4	18	20.0	29	14.5	7.09	168	32.0
1245	322.0	15.4	11	1616	340	9410	2181	630	15860	1964	0.4	18	20.0	29	14.5	7.26	168	32.0
1300	286.5	14.9	11	1606	310	8210	2185	630	15890	2034	0.4	18	20.0	29	14.5	7.34	167	32.0
1315	250.5	14.4	11	1598	310	7990	2185	630	15850	2097	0.4	18	20.0	29	14.5	7.26	168	32.0
1330	215.0	13.9	11	1603	310	8050	2189	630	15900	2160	0.3	18	19.0	29	14.5	7.71	168	31.0
1345	179.5	13.5	11	1582	300	8000	2180	630	15880	2224	0.3	18	19.0	29	15.0	6.40	169	31.0
1400	144.0	13.2	11	1594	300	7970	2178	630	15850	2285	0.2	18	19.0	29	15.0	6.25	167	34.0
1415	257.5	12.8	7	1588	350	9450	2194	630	15820	2347	0.7	18	19.0	29	15.0	7.41	169	34.0
1430	221.5	12.6	7	1600	340	9220	2198	630	15850	2415	0.6	18	19.0	29	15.0	7.69	168	39.0
1445	186.0	12.6	0	1603	340	8970	2201	630	15800	2484	0.5	18	19.0	30	15.0	7.15	168	33.5
1500	149.0	12.0	0	1621	330	8740	2205	630	15740	2550	0.4	18	18.5	30	15.0	6.96	168	33.0
1515	114.5	11.2	0	1632	340	9000	2210	630	15800	2616	0.3	18	18.5	30	15.0	7.29	167	32.5
1530	79.0	17.3	11	1621	330	8800	2212	630	15780	2676	0.3	18	18.5	30	15.0	7.10	167	32.5
1545	0.0	0.0	0	1603	420	11140	2202	630	15850	2739	0.3	18	18.5	30	15.0	7.16	167	32.5
Avg:	232.3	14.3	7.6	1604.9	343.2	9151.4	2187.5	630.0	15950.0	2062.6	0.5	18.0	19.8	29.6	14.4	7.15	167.5	32.6
Min:	0.0	0.0	0.0	1568.0	300.0	7970.0	2148.0	630.0	15740.0	1362.0	0.2	18.0	18.5	29.0	13.0	6.18	166.0	31.0
Max:	367.0	17.8	11.0	1682.0	590.0	15900.0	2212.0	630.0	16260.0	2739.0	2.5	18.0	21.0	30.0	15.0	8.12	169.0	39.0

Test 8
9-7-88

	Kiln Pressure ("wc)	AB Pressure ("wc)	Quench Water Flow (gpm)	AB Exit O2 (%)	AB Exit CO (ppm)	AB Exit CO2 (%)	AB Exit UTHC (ppm)	Kiln Exit O2 (%)	Scrubber Exit CO (ppm)	Scrubber Exit CO2 (%)	Scrubber Exit NOx (ppm)	Scrubber Exit HTHC (ppm)	Scrubber Exit UTHC (ppm)	Stack O2 (%)	Stack CO (ppm)	Stack CO2 (%)	Stack HTHC (ppm, CH4)
	0.025	0.12	15	5.6	0.0	9.5	-0.2	12.2	0.0	6.4	71.0	2.1	0.2	10.8	21.0	13.8	-0.4
	0.020	0.12	15	7.0	0.0	8.8	-0.1	14.7	0.0	6.0	70.0	1.7	0.5	11.9	35.0	13.3	-0.3
	0.020	0.12	15	6.0	0.0	9.8	-0.3	12.5	0.0	6.6	71.0	0.9	0.2	10.9	20.0	14.0	0.0
	0.020	0.12	15	6.2	0.0	9.6	-0.4	12.8	0.0	6.6	71.0	1.5	0.5	11.0	21.0	14.5	-0.1
	0.020	0.12	15	6.5	0.0	9.7	-0.2	13.8	0.0	6.5	67.0	0.9	0.4	11.2	43.0	14.3	0.0
	0.020	0.12	15	6.5	0.0	9.4	-0.2	13.9	0.0	6.3	70.0	0.4	0.4	11.4	30.0	13.9	0.6
	0.020	0.12	15	6.3	0.0	9.6	-0.3	14.1	0.0	6.2	76.0	0.2	0.1	11.3	19.0	13.4	0.2
	0.020	0.12	15	6.8	0.0	9.7	-0.5	13.9	3.0	6.5	76.0	0.4	0.6	11.3	26.0	14.5	0.5
	0.020	0.12	15	6.0	0.0	10.0	-0.6	14.0	3.0	6.5	77.0	0.1	0.2	11.2	35.0	14.8	0.6
	0.020	0.12	15	5.7	0.0	9.9	-0.2	13.6	2.0	6.7	83.0	1.0	0.4	11.1	23.0	15.0	0.8
	0.020	0.12	15	5.8	0.0	9.9	-0.2	13.9	3.0	6.5	84.0	0.8	0.0	11.0	26.0	14.3	0.6
	0.020	0.12	15	5.9	0.0	9.8	0.4	14.0	3.0	6.7	77.0	0.5	-0.1	11.1	7.0	14.6	1.1
	0.020	0.12	15	5.9	0.0	9.7	0.7	13.8	3.0	6.6	88.0	1.4	0.1	11.1	0.0	14.9	-0.1
	0.020	0.12	15	6.3	0.0	9.7	0.2	14.0	3.0	6.4	79.0	0.5	0.0	11.1	0.0	14.6	0.3
	0.020	0.12	15	5.5	0.0	10.0	-0.2	14.0	1.0	5.4	75.0	0.6	0.2	11.4	0.0	14.2	0.8
	0.020	0.12	15	5.4	0.0	10.2	-0.2	12.9	3.0	6.9	73.0	1.4	0.3	10.7	14.0	14.0	1.1
	0.020	0.12	15	5.5	0.0	10.3	-0.1	13.2	3.0	6.8	73.0	0.3	0.2	10.8	13.0	14.6	0.5
	0.020	0.12	15	5.4	0.0	10.2	-0.3	13.2	2.0	6.8	82.0	1.1	0.1	10.9	3.0	14.6	1.5
	0.020	0.12	15	5.6	0.0	10.3	-0.2	13.0	3.0	6.6	67.0	1.2	0.2	11.0	2.0	15.0	1.4
	0.020	0.12	15	5.5	0.0	10.3	0.3	13.0	2.0	6.7	77.0	0.6	-0.1	11.0	9.0	14.9	1.0
	0.030	0.12	15	5.8	0.0	8.3	-0.1	13.3	7.0	5.5	117.0	0.1	0.8	11.3	4.0	12.6	0.0
	0.030	0.15	15	7.3	0.0	8.3	0.4	13.9	2.0	5.7	78.0	0.8	0.0	11.5	3.0	12.8	-0.6
Avg:	0.021	0.12	15.0	6.0	0.0	9.7	-0.1	13.5	2.0	6.5	77.4	0.8	0.2	11.1	16.1	14.2	0.4
Min:	0.020	0.12	15.0	5.4	0.0	8.3	-0.6	12.2	0.0	5.5	67.0	0.1	-0.1	10.7	0.0	12.6	-0.6
Max:	0.030	0.15	15.0	7.3	0.0	10.3	0.7	14.7	7.0	6.9	117.0	2.1	0.8	11.9	43.0	15.0	1.5

Test 9
9-9-88

Time	Clay Feed Weight Reading (lbs)	Metals Feed Weight Reading (lbs)	Feed Metals Rotometer	Kiln Exit Temp (^{0}F)	Kiln Gas Flow (scfh)	Kiln Air Flow (scfh)	Kiln Aux Air Flow (scfh)	AB Exit Temp (^{0}F)	AB Gas Flow (scfh)	AB Air Flow (scfh)	Make-up Water Cum. (gal)	Blowdown Water (gpm)	Venturi Flow (gpm)	Venturi Pressure ("wc)	Packed Column Flow (gpm)	Packed Column Pressure ("wc)	Liquor pH	Liquor Temp (^{0}F)
908	382.0	17.9	0	1587	390	12570	0	1827	780	8830	8042	0.5	19	27.0	29	5.0	7.05	162
915	382.0	17.9	0	1631	410	12790	0	1792	430	13230	8062	0.2	19	27.0	29	5.0	6.99	162
930	382.0	17.9	0	1587	380	11680	0	1813	430	13170	8100	0.5	19	27.0	29	5.0	6.96	163
945	382.0	17.9	0	1595	380	11950	0	1816	420	13100	8145	0.5	19	27.0	29	5.0	6.90	165
1000	382.5	17.9	0	1584	380	11900	0	1816	400	12510	8189	0.5	19	26.5	29	5.0	6.88	164
1015	382.5	0.0	0	1594	390	11380	0	1815	390	12220	8231	0	19	26.5	29	5.0	6.85	163
1030	382.5	13.8	0	1586	400	12130	0	1815	390	11930	8262	0	19	26.5	29	5.0	6.80	163
1045	383.0	13.2	0	1575	400	12190	0	1811	380	11520	8312	0.5	19	26.5	29	5.0	6.82	162
1100	365.0	12.7	11	1648	280	7680	7775	1788	340	12890	8350	0.4	19	27.0	29	5.0	6.16	163
1115	330.0	12.4	11	1649	220	7880	7791	1812	470	19060	8390	0.4	18	20.5	28	7.5	6.16	164
1130	294.5	12.2	11	1600	220	7650	7789	1797	470	19060	8442	0.4	18	24.5	28	7.2	6.36	163
1145	260.0	11.9	11	1603	220	7410	7775	1799	470	19060	8483	0	18	24.5	28	7.3	5.98	164
1200	225.0	11.6	11	1598	230	7510	7766	1799	470	19060	8533	0.5	18	25.0	28	7.0	6.82	163
1215	190.0	11.3	11	1611	220	6940	7775	1801	470	19060	8582	0.5	18	25.0	28	7.0	6.90	163
1230	155.5	10.9	11	1606	220	8100	7763	1802	470	19060	8632	0.5	18	25.0	29	7.0	5.85	163
1245	116.0	10.6	11	1611	220	8360	7765	1805	470	19060	8690	0.5	18	25.0	28	7.0	8.03	162
1300	242.5	10.3	11	1611	220	8120	7760	1804	470	19060	8733	0.5	18	25.0	28	7.0	6.66	164
1315	308.5	9.9	11	1605	210	7410	7787	1806	470	19060	8781	0.5	18	25.0	28	7.0	7.54	164
1330	274.0	9.5	11	1607	210	7650	7743	1804	460	19060	8830	0.5	18	25.0	28	7.0	7.08	163
1345	239.0	9.1	11	1608	210	7410	7763	1804	460	19060	8878	0.5	18	25.0	28	7.0	7.01	164
1400	204.0	8.8	11	1612	220	7810	7766	1804	470	19060	8934	0.5	18	25.0	28	7.0	7.46	164
1415	169.5	8.3	11	1605	210	7410	7768	1805	460	19060	8973	0.5	18	25.0	28	7.0	7.20	164
1430	235.0	7.9	11	1611	210	7410	7768	1794	460	19060	9022	0.5	18	25.0	28	7.0	7.60	164
1445	200.0	7.7	11	1611	210	7410	7773	1805	460	19060	9071	0.5	18	25.0	28	7.0	6.87	163
1500	165.0	7.2	11	1587	200	7180	7773	1798	460	19060	9120	0.5	18	25.0	28	7.0	6.96	163
1515	130.0	6.8	11	1603	210	7410	7761	1801	460	19060	9166	0.5	18	25.0	28	7.0	6.28	164
1530	118.0	6.7	0	1614	350	12610	0	1795	460	19060	9218	0.5	18	25.0	28	7.0	6.68	165
Avg:	269.6	11.2	7.3	1605.1	274.8	9109.3	5180.0	1804.7	457.0	16758.5	8610.0	0.4	18.3	25.4	28.4	6.4	6.85	163.4
Min:	116.0	0.0	0.0	1575.0	200.0	6940.0	0.0	1788.0	340.0	8830.0	8042.0	0.0	18.0	20.5	28.0	5.0	5.85	162.0
Max:	383.0	17.9	11.0	1649.0	410.0	12790.0	7791.0	1827.0	780.0	19060.0	9218.0	0.5	19.0	27.0	29.0	7.5	8.03	165.0

Test 9
9-9-88

	ID Fan Inlet ("wc)	Kiln Pressure ("wc)	AB Pressure ("wc)	Quench Water Flow (gpm)	AB Exit O2 (%)	AB Exit CO (ppm)	AB Exit CO2 (%)	AB Exit UTHC (ppm)	Kiln Exit O2 (%)	Scrubber Exit CO (ppm)	Scrubber Exit CO2 (%)	Scrubber Exit NOx (ppm)	Scrubber Exit HTHC (ppm)	Scrubber Exit UTHC (ppm)	Stack O2 (%)	Stack CO (ppm)	Stack CO2 (%)	Stack HTHC (ppm, CH4)
	30.0	0.080	0.12	14	9.2	0.0	6.4	0.0	14.0	1.0	4.3	0.0	1.3	1.3	13.7	22.0	9.9	0.0
	30.0	0.050	0.12	14	7.9	0.0	7.9	-0.4	13.8	2.0	5.4	46.0	1.3	1.0	12.5	22.0	12.5	0.2
	30.0	0.050	0.12	14	8.4	0.0	7.6	-0.4	13.8	0.0	5.2	47.0	0.6	1.0	12.6	13.0	11.7	0.2
	30.0	0.050	0.12	14	8.2	0.0	7.7	0.2	13.7	1.0	5.3	47.0	-0.6	0.7	12.7	15.0	12.2	-0.1
	30.0	0.050	0.12	14	8.5	0.0	7.6	0.2	13.9	1.0	4.9	45.0	2.7	0.7	13.0	21.0	11.7	13.0
	30.0	0.050	0.12	14	8.6	0.0	7.5	0.3	13.9	0.0	4.8	43.0	0.2	1.2	13.1	9.0	11.6	-0.2
	30.0	0.050	0.12	14	8.6	0.0	7.4	0.2	13.8	1.0	4.9	45.0	0.2	1.0	13.1	17.0	11.6	-0.2
	30.0	0.080	0.15	14	8.7	0.0	7.3	-0.3	13.8	2.0	4.8	45.0	0.4	1.3	13.3	19.0	11.1	-0.2
	30.0	0.035	0.06	14	7.8	0.0	8.6	-0.4	11.3	2.0	5.6	47.0	0.6	1.4	12.5	3.0	12.7	0.1
	26.0	0.030	0.08	14	7.2	0.0	8.9	-0.2	11.3	1.0	6.2	44.0	1.0	0.7	11.9	10.0	14.2	0.0
	30.0	0.030	0.06	14	8.7	0.0	8.7	-0.6	12.9	1.0	5.1	40.0	1.3	0.8	12.9	20.0	12.9	-0.1
	29.0	0.035	0.06	14	8.4	0.0	8.1	-0.6	12.9	2.0	5.6	42.0	4.9	-0.3	12.5	0.0	12.9	1.5
	29.0	0.030	0.06	14	8.4	0.0	8.1	1.5	12.7	1.0	5.6	41.0	4.1	0.3	12.6	8.0	13.1	-0.1
	29.0	0.030	0.06	14	8.7	0.0	8.1	0.4	12.7	3.0	5.7	41.0	16.6	-0.6	12.6	0.0	13.1	-0.2
	30.0	0.030	0.08	13	8.5	0.0	8.1	-0.2	12.6	2.0	5.6	41.0	20.7	-1.3	12.5	-11.0	12.7	-0.1
	30.0	0.030	0.08	14	8.5	0.0	8.1	-0.9	12.5	1.0	5.6	40.0	21.2	-2.0	12.5	2.0	12.2	0.0
	29.0	0.030	0.08	14	8.3	0.0	8.3	-1.1	12.6	1.0	5.5	40.0	22.8	-2.4	12.6	13.0	13.0	0.0
	30.0	0.030	0.08	14	8.8	0.0	8.0	-0.4	12.8	2.0	5.6	40.0	27.1	-1.5	12.8	8.0	12.8	0.1
	30.0	0.030	0.08	14	8.5	0.0	7.9	-1.2	12.7	2.0	5.6	44.0	25.5	-1.9	12.7	14.0	12.9	-0.5
	30.0	0.030	0.08	14	8.5	0.0	7.8	-1.7	12.7	1.0	5.5	43.0	25.7	-2.2	12.7	0.0	12.1	1.1
	30.0	0.030	0.08	14	8.7	0.0	7.9	-1.5	12.6	2.0	5.2	39.0	22.8	-2.5	13.3	0.0	12.0	0.0
	30.0	0.030	0.08	14	8.7	0.0	7.9	-1.5	12.6	3.0	5.3	44.0	25.4	-2.8	12.8	0.0	12.6	0.2
	30.0	0.030	0.08	14	8.7	0.0	7.9	-1.4	12.6	3.0	5.4	42.0	25.2	-2.9	12.5	8.0	12.7	-0.2
	30.0	0.030	0.08	14	8.7	0.0	7.9	-1.6	12.5	0.0	5.7	37.0	25.5	-3.3	12.6	2.0	12.6	-0.3
	30.0	0.030	0.08	14	9.1	1.0	7.6	-1.5	12.9	3.0	5.5	42.0	24.2	-3.1	12.7	0.0	12.5	0.0
	30.0	0.030	0.08	14	8.9	1.0	7.8	-1.6	12.5	2.0	5.6	42.0	23.0	-3.3	12.6	0.0	12.0	-0.2
	30.0	0.035	0.06	14	9.6	0.0	6.8	-1.6	13.7	2.0	4.8	39.0	21.6	-3.2	13.1	1.0	11.4	0.0
Avg:	29.7	0.039	0.09	14.0	8.5	0.1	7.8	-0.6	12.9	1.6	5.3	41.0	12.8	-0.8	12.7	8.0	12.3	0.5
Min:	26.0	0.030	0.06	13.0	7.2	0.0	6.4	-1.7	11.3	0.0	4.3	0.0	-0.6	-3.3	11.9	-11.0	9.9	-0.5
Max:	30.0	0.080	0.15	14.0	9.6	1.0	8.9	1.5	14.0	3.0	6.2	47.0	27.1	1.4	13.7	22.0	14.2	13.0

Test 4
9-14-88

Time	Clay Feed Weight Reading (lbs)	Metals Feed Weight Reading (lbs)	Feed Metals Rotometer	Kiln Exit Temp (°F)	Kiln Gas Flow (scfh)	Kiln Air Flow (scfh)	Kiln Aux Air Flow (scfh)	AB Exit Temp (°F)	AB Gas Flow (scfh)	AB Air Flow (scfh)	Make-up Water Cum. (gal)	Blowdown Water (gpm)	Venturi Flow (gpm)	Venturi Pressure ("wc)	Packed Column Flow (gpm)	Packed Column Pressure ("wc)	Liquor pH	Liquor Temp (°F)
900	384.5	19.6	11	1507	320	11590	7832	1980	510	17990	1645	0.8	18	28.0	28	8.0	7.28	164
915	349.5	19.3	11	1609	270	7880	7820	1985	540	19060	1700	0.8	18	28.0	28	8.0	7.02	165
1930	315.5	19.0	11	1623	210	7410	7823	1990	600	19060	1759	0.7	18	25.0	28	9.5	7.16	165
1945	281.0	18.6	11	1629	190	6700	7832	1994	600	19060	1820	0.7	18	24.0	28	8.8	7.17	167
1000	0.0	18.3	0	1581	180	6230	7804	1994	590	19060	1883	0.7	18	24.0	28	8.5	7.16	166
1115	883.5	18.4	11	1517	260	10960	7741	1992	570	19060	2168	0.7	18	24.0	28	8.5	7.30	166
1130	845.0	17.9	11	1605	200	7180	7729	2012	610	19060	2236	0.7	18	24.0	28	9.5	7.13	167
1145	810.0	17.6	11	1603	190	6700	7738	1999	580	19060	2294	0.5	18	24.0	28	8.5	7.20	166
1200	775.0	17.3	11	1625	180	6230	7729	1991	580	19060	2348	0.5	18	24.0	28	8.7	7.16	166
1215	738.5	17.0	11	1619	180	6230	7718	1989	580	19060	2407	0.5	18	24.0	28	8.7	7.23	166
1230	309.0	16.8	11	1587	180	6470	7787	1996	580	19060	2465	0.4	18	24.0	28	8.7	7.19	165
1245	274.0	16.5	11	1592	170	5990	7474	1994	580	19060	2524	0.4	18	24.0	28	8.7	7.23	165
1300	239.0	16.3	0	1603	180	5990	7786	1991	580	19060	2584	0.4	17	24.0	27	8.7	7.20	166
1315	204.0	16.0	11	1606	170	5990	7776	2003	600	19060	2638	0.4	17	24.0	27	9.0	7.20	166
1330	169.0	15.8	11	1621	170	5990	7752	2008	610	19060	2693	0.4	17	24.0	27	9.0	7.27	167
1345	134.5	15.3	11	1614	160	5620	7760	2011	610	19060	2751	0.4	17	24.0	27	9.0	7.15	166
1400	208.0	14.8	11	1606	160	5760	7745	2008	600	19060	2809	0.4	17	24.0	27	9.0	7.18	166
1415	174.0	14.5	11	1602	170	5680	7744	2006	590	19060	2867	0.4	17	24.0	27	9.0	7.23	166
1430	139.5	14.0	11	1610	170	5760	7734	2004	600	19060	2925	0.4	17	23.0	28	9.5	7.21	166
1445	105.0	13.6	0	1603	170	5760	7751	2002	590	19060	2985	0.4	17	23.0	28	9.5	7.22	166
1500	69.5	13.1	11	1602	170	5760	7760	2001	600	19060	3041	0.04	17	23.0	27	9.5	7.20	166
1515	0.0	13.1	0	1599	380	12850	7756	2009	560	19060	3092	0.04	17	23.0	27	9.8	7.22	166
Avg:	336.7	16.5	9.0	1598.3	199.1	7033.2	7754.1	1998.1	584.5	19011.4	2430.0	0.5	17.5	24.2	27.6	8.9	7.20	165.9
Min:	0.0	13.1	0.0	1507.0	160.0	5620.0	7474.0	1980.0	510.0	17990.0	1645.0	0.0	17.0	23.0	27.0	8.0	7.02	164.0
Max:	883.5	19.6	11.0	1629.0	380.0	12850.0	7832.0	2012.0	610.0	19060.0	3097.0	0.8	18.0	28.0	28.0	9.8	7.30	167.0

Test 4
9-14-88

	ID Fan Inlet ("wc)	Kiln Pressure ("wc)	AB Pressure ("wc)	Quench Water Flow (gpm)	AB Exit O2 (%)	AB Exit CO (ppm)	AB Exit CO2 (%)	AB Exit UTHC (ppm)	Kiln Exit O2 (%)	Scrubber Exit CO (ppm)	Scrubber Exit CO2 (%)	Scrubber Exit NOx (ppm)	Scrubber Exit HTHC (ppm)	Scrubber Exit UTHC (ppm)	Stack O2 (%)	Stack CO (ppm)	Stack CO2 (%)	Stack HTHC (ppm, CH4)
	34.0	0.030	0.08	14	10.1	0.0	6.7	-0.2	13.4	0.0	5.5	1.0	1.1	1.1	13.0	173.0	4.7	1.3
	34.0	0.040	0.10	14	7.3	0.0	9.1	-0.6	11.3	0.0	6.5	1.0	3.3	1.7	11.7	173.0	5.6	3.2
	32.5	0.045	0.10	14	6.9	0.0	9.2	0.0	12.3	1.0	6.0	1.0	0.9	1.7	11.7	175.0	5.4	0.5
	31.0	0.050	0.10	14	7.3	0.0	8.5	-0.2	12.1	0.0	5.9	42.0	0.7	1.6	11.7	174.0	5.2	0.7
	31.0	0.065	0.10	19	9.4	0.0	6.8	0.1	12.6	0.0	4.5	57.0	1.0	2.1	12.9	172.0	4.3	0.6
	31.0	0.030	0.10	14	9.8	0.0	6.6	-0.4	13.7	1.0	5.3	37.0	0.4	1.6	13.0	165.0	4.6	0.2
	30.0	0.050	0.10	14	6.6	0.0	9.6	-0.8	11.9	1.0	6.2	43.0	0.0	1.4	11.5	158.0	5.2	0.1
	30.0	0.050	0.10	14	7.1	0.0	9.2	-0.5	12.3	2.0	6.1	44.0	1.0	1.6	11.8	158.0	5.1	0.5
	30.0	0.040	0.10	14	6.7	0.0	9.6	-0.8	12.0	2.0	6.1	39.0	1.3	1.4	11.9	146.0	5.2	0.2
	30.0	0.040	0.10	14	7.0	0.0	9.5	0.6	12.1	2.0	5.9	40.0	2.3	1.4	11.9	153.0	5.1	0.2
	30.0	0.040	0.10	14	7.2	0.0	8.1	1.3	17.3	1.0	6.1	41.0	-0.2	2.0	17.2	141.0	5.2	0.3
	30.0	0.045	0.10	14	7.5	0.0	9.2	-0.5	17.4	0.0	3.8	41.0	0.6	1.4	12.1	140.0	5.2	0.3
	30.0	0.045	0.10	14	7.3	0.0	9.8	-0.4	17.6	1.0	6.1	40.0	0.3	1.4	11.9	154.0	5.2	0.1
	30.0	0.020	0.10	14	7.0	0.0	9.3	-0.9	16.0	1.0	6.0	45.0	1.0	1.3	11.7	157.0	5.2	0.1
	30.0	0.020	0.10	14	6.9	0.0	9.4	-0.2	13.7	3.0	6.5	43.0	0.2	0.9	11.4	156.0	5.5	0.4
	30.0	0.020	0.10	14	6.8	0.0	9.3	-0.5	14.2	2.0	6.3	53.0	-0.2	1.0	11.5	148.0	5.4	0.2
	30.0	0.020	0.10	14	7.2	0.0	8.9	-0.2	14.8	2.0	6.2	50.0	0.2	1.4	11.6	147.0	5.2	0.0
	30.0	0.020	0.10	14	7.1	0.0	9.1	0.1	14.6	1.0	6.5	45.0	0.1	1.1	11.5	140.0	5.5	0.1
	30.0	0.020	0.10	14	7.1	0.0	9.0	-0.2	12.4	2.0	6.3	52.0	-0.3	1.4	11.6	142.0	5.4	0.2
	30.0	0.020	0.10	14	7.3	0.0	9.0	-0.6	12.3	1.0	6.2	50.0	-0.2	0.9	11.6	146.0	5.4	0.1
	30.0	0.040	0.10	14	7.4	0.0	8.9	-0.4	12.3	2.0	4.8	60.0	0.1	1.0	11.6	153.0	5.1	0.2
	30.0	0.020	0.10	14	8.9	0.0	7.5	0.6	13.6	0.0	5.3	44.0	10.5	1.6	12.4	142.0	4.7	0.5
Avg:	30.6	0.035	0.10	14.2	7.5	0.0	8.7	-0.2	13.6	1.1	5.8	39.5	1.1	1.4	12.1	155.1	5.2	0.5
Min:	30.0	0.020	0.08	14.0	6.6	0.0	6.6	-0.9	11.3	0.0	3.8	1.0	-0.3	0.9	11.4	140.0	4.3	0.0
Max:	34.0	0.065	0.10	19.0	10.1	0.0	9.6	1.3	17.6	3.0	6.5	60.0	10.5	2.1	17.2	175.0	5.6	3.2

Test 6
9-16-88

Time	Clay Feed Weight Reading (lbs)	Metals Feed Weight Reading (lbs)	Feed Metals Rotometer	Kiln Exit Temp (°F)	Kiln Gas Flow (scfh)	Kiln Air Flow (scfh)	Kiln Aux Air Flow (scfh)	AB Exit Temp (°F)	AB Gas Flow (scfh)	AB Air Flow (scfh)	Make-up Water Cum. (gal)	Blowdown Water (gpm)	Venturi Flow (gpm)	Venturi Pressure ("wc)	Packed Column Flow (gpm)	Packed Column Pressure ("wc)	Liquor pH	Liquor Temp (°F)
1015	392.0	13.1	0	1720	470	16400	0	2012	590	19060	8222	0.5	17	25.0	25	11.5	7.15	166
1030	373.5	12.8	11	1715	330	11430	7906	2016	590	19060	8277	0.2	17	23.0	25	13.5	7.04	166
1045	337.0	12.6	11	1698	300	10720	7901	1942	610	19060	8340	0.5	17	23.0	25	14.0	7.35	166
1100	301.0	12.6	11	1707	300	10490	7907	1995	610	19060	8402	0.5	17	23.0	25	14.0	7.44	166
1115	265.5	12.4	11	1671	270	9300	7905	1996	610	19060	8462	0.6	17	23.0	25	14.0	6.80	166
1130	239.5	12.1	11	1687	270	9780	7906	1993	610	19060	8525	0.5	17	23.0	25	14.0	7.97	166
1145	196.0	11.7	11	1699	270	9300	7907	1997	610	19060	8587	0.5	17	23.0	25	14.0	6.72	166
1200	161.0	11.3	11	1690	270	9540	7903	1998	610	19060	8650	0.5	17	23.0	25	14.0	6.41	166
1215	127.0	11.0	11	1689	270	9540	7903	2000	610	19060	8710	0.5	17	23.0	25	14.0	6.62	166
1230	92.5	10.6	11	1694	270	9540	7904	2004	610	19060	8774	0.5	17	23.0	25	14.0	7.05	166
1245	382.0	10.9	11	1691	270	9540	7715	2002	580	19060	8836	0.5	17	23.0	25	14.0	7.28	167
1300	347.5	9.7	11	1688	270	9540	7710	1989	580	19060	8895	0.2	17	23.0	25	14.0	7.27	166
1315	312.5	9.3	11	1694	260	9540	7716	1987	580	19060	8958	0.2	17	23.0	25	13.5	6.86	167
1330	278.0	9.0	11	1682	270	9540	7702	1991	580	19060	9002	0.2	17	23.0	25	13.5	6.94	166
1345	244.0	8.6	11	1680	280	9670	7686	1989	580	19060	9087	1.0	17	23.0	25	13.5	7.75	166
1400	209.5	8.2	11	1707	280	10250	7693	2010	610	19060	9153	1.0	17	23.0	25	13.5	7.08	166
1415	175.5	7.9	11	1709	280	10010	7689	2010	600	19060	9218	0.5	17	23.0	25	13.5	6.60	166
1430	152.5	7.7	0	1380	500	15740	7694	1701	670	16830	9281	0.5	17	23.0	25	15.0	7.42	155
1445	132.5	7.5	11	1694	320	11670	7686	1987	630	19060	9336	0.5	17	23.0	25	14.0	7.58	167
1500	98.0	7.4	11	1702	270	9780	7644	2010	620	19060	9398	0.4	17	22.0	25	14.0	8.20	167
1515	63.5	7.0	11	1693	270	9780	7637	2003	610	19060	9463	0.4	17	22.0	25	14.5	6.57	166
1530	40.0	6.8	0	1709	420	15450	7647	2013	610	19060	9523	0.5	17	22.0	25	14.5	7.04	167
Ave:	223.7	10.0	9.5	1681.8	305.0	10752.3	7425.5	1983.9	605.0	18950.6	8860.1	0.5	17.0	23.0	25.0	13.8	7.14	165.7
Min:	40.0	6.8	0.0	1380.0	260.0	9300.0	0.0	1701.0	580.0	16830.0	8222.0	0.2	17.0	22.0	25.0	11.5	6.41	155.0
Max:	392.0	13.1	11.0	1720.0	500.0	16400.0	7907.0	2016.0	670.0	19060.0	9523.0	1.0	17.0	25.0	25.0	15.0	8.20	167.0

Test 6
9-16-88

	ID Fan Inlet ("wc)	Kiln Pressure ("wc)	AB Pressure ("wc)	Quench Water Flow (gpm)	AB Exit O2 (%)	AB Exit CO (ppm)	AB Exit CO2 (%)	AB Exit UTHC (ppm)	Kiln Exit O2 (%)	Scrubber Exit CO (ppm)	Scrubber Exit CO2 (%)	Scrubber Exit NOx (ppm)	Scrubber Exit HTHC (ppm)	Scrubber Exit UTHC (ppm)	Stack O2 (%)	Stack CO (ppm)	Stack CO2 (%)	Stack HTHC (ppm, CH4)
	35.0	0.030	0.10	18	7.2	0.0	0.0	1.4	15.9	0.0	0.0	52.0	1.7	4.0	12.1	192.0	5.0	0.7
	34.0	0.030	0.13	18	6.4	0.0	0.0	1.4	15.4	0.0	0.0	64.0	3.9	43.0	11.6	198.0	5.3	0.6
	34.0	0.030	0.12	18	7.0	0.0	0.0	1.7	16.4	0.0	0.0	47.0	2.5	4.3	11.8	187.0	5.3	0.3
	34.0	0.030	0.12	18	7.5	0.0	9.2	0.6	16.0	0.0	5.6	47.0	1.8	3.8	11.8	201.0	5.4	0.3
	34.0	0.030	0.12	18	7.4	0.0	9.0	1.5	16.2	0.0	5.4	46.0	2.0	3.7	12.2	149.0	5.2	0.2
	34.0	0.030	0.12	18	7.4	0.0	8.9	1.5	16.0	0.0	5.5	56.0	3.0	3.6	12.2	184.0	5.2	0.3
	34.0	0.020	0.12	14	7.1	0.0	8.8	1.3	15.2	0.0	5.1	55.0	2.9	3.6	12.2	190.0	5.0	0.7
	35.0	0.020	0.12	14	7.2	0.0	9.1	1.5	12.7	1.0	5.5	53.0	5.2	3.3	12.1	198.0	5.1	0.2
	34.0	0.020	0.12	18	7.3	0.0	9.5	1.4	11.5	1.0	5.5	53.0	3.4	3.3	12.1	204.0	5.3	0.6
	34.0	0.020	0.12	18	6.9	0.0	9.1	1.0	12.9	0.0	5.3	54.0	1.7	3.1	12.2	196.0	5.3	0.3
	34.0	0.020	0.12	18	7.4	0.0	87.0	1.4	13.7	0.0	5.1	58.0	1.6	4.0	12.4	186.0	5.0	0.6
	34.0	0.020	0.12	18	7.6	0.0	8.8	1.4	10.6	0.0	5.1	54.0	3.4	3.5	12.3	191.0	4.9	0.6
	34.0	0.020	0.12	18	7.5	0.0	8.8	1.4	10.6	0.0	5.4	53.0	2.8	3.2	12.4	182.0	5.1	0.2
	34.0	0.020	0.12	18	7.6	0.0	8.8	1.4	10.7	0.0	5.4	58.0	3.0	3.1	12.2	195.0	5.1	0.2
	34.0	0.020	0.12	18	7.6	0.0	8.6	1.2	10.8	0.0	5.5	53.0	3.7	3.0	12.3	194.0	5.3	0.2
	34.0	0.020	0.12	18	7.4	0.0	8.9	0.9	10.4	1.0	53.0	58.0	5.0	2.1	12.1	212.0	5.3	0.4
	34.0	0.020	0.12	18	7.4	0.0	8.7	0.6	10.7	1.0	5.3	53.0	2.5	3.2	12.0	200.0	5.1	2.9
	35.0	0.000	0.12	18	15.9	10.0	3.1	0.2	18.1	1.0	4.8	43.0	3.8	2.6	14.9	192.0	4.5	0.2
	34.0	0.020	0.12	18	6.3	0.0	9.5	0.4	10.0	1.0	6.4	66.0	0.9	1.9	11.0	187.0	5.5	0.2
	34.0	0.020	0.12	18	6.8	0.0	9.2	0.5	10.5	1.0	6.3	57.0	1.7	2.8	11.4	195.0	5.4	0.3
	34.0	0.020	0.12	18	7.3	0.0	8.8	0.2	10.5	1.0	6.3	68.0	1.4	2.9	11.6	192.0	5.4	0.2
	34.0	0.020	0.12	18	8.6	0.0	7.5	0.2	12.7	1.0	5.6	62.0	2.4	3.5	11.2	181.0	5.0	0.3
Ave:	34.1	0.022	0.12	17.6	7.7	0.5	11.0	1.1	13.0	0.4	6.9	55.0	2.7	5.1	12.1	191.2	5.2	0.5
Min:	34.0	0.000	0.10	14.0	6.3	0.0	0.0	0.2	10.0	0.0	0.0	43.0	0.9	1.9	11.0	149.0	4.5	0.2
Max:	35.0	0.030	0.13	18.0	15.9	10.0	87.0	1.7	18.1	1.0	53.0	68.0	5.2	43.0	14.9	212.0	5.5	2.9

Test 10
9-20-88

Time	Clay Feed Weight Reading (lbs)	Metals Feed Weight Reading (lbs)	Feed Metals Rotometer	Kiln Exit Temp (°F)	Kiln Gas Flow (scfh)	Kiln Air Flow (scfh)	Kiln Aux Air Flow (scfh)	AB Exit Temp (°F)	AB Gas Flow (scfh)	AB Air Flow (scfh)	Make-up Water Cum. (gal)	Blowdown Water (gpm)	Venturi Flow (gpm)	Venturi Pressure ("wc)	Packed Column Flow (gpm)	Packed Column Pressure ("wc)	Liquor pH	Liquor Temp (°F)
915	391.0	19.7	0	1603	410	14270	0	1786	570	19060	5821	1.5	20	25.0	30	11.5	6.45	165
930	391.0	19.8	0	1605	420	14370	0	1985	570	19060	5984	1.5	20	25.0	30	11.5	6.85	165
945	386.0	19.7	11	1578	290	11190	7615	1984	630	19060	6058	0.7	20	25.0	30	11.5	6.33	166
1000	351.5	19.4	11	1578	230	2360	7611	2012	600	19060	6118	0.7	20	25.0	30	11.5	6.15	166
1015	316.0	19.2	11	1594	290	8590	7605	1992	610	19060	6180	0.5	20	25.0	30	11.5	5.99	167
1030	281.0	18.9	11	1596	230	8120	7608	2005	610	19060	6238	0.4	20	25.0	30	11.5	7.81	167
1045	246.0	18.7	11	1602	250	8830	7638	2000	610	19060	6294	0.4	20	23.0	30	11.5	7.94	168
1100	211.0	18.3	11	1588	230	8590	7611	1989	610	19060	6356	0.5	20	23.0	30	12.5	7.44	166
1115	177.0	17.9	11	1591	230	5890	7588	1992	620	19060	6418	0.5	20	23.0	30	13.0	5.18	168
1130	142.0	17.6	11	1605	250	9040	7585	2006	630	19060	6478	0.4	20	23.0	30	13.0	8.23	167
1145	108.0	17.1	11	1616	230	5890	7593	2003	630	19060	6536	0.4	20	23.0	30	12.0	8.24	167
1200	387.5	16.7	11	1619	230	8150	7588	2005	620	19060	6603	0.4	20	22.0	30	13.0	5.75	167
1215	353.0	16.4	11	1621	230	8360	7617	2005	620	19060	6662	0.4	20	22.0	30	13.0	5.69	167
1230	318.0	16.1	11	1565	200	7010	7622	1999	630	19060	6721	0.4	20	22.0	30	13.0	6.47	167
1245	283.0	15.6	11	1608	230	8590	7569	2001	620	19060	6782	0.5	20	22.0	30	13.0	6.64	168
1300	298.5	15.2	11	1613	230	8360	7568	2003	620	19060	6841	0.5	20	22.0	30	13.0	7.14	167
1315	214.0	14.8	11	1614	220	8120	7592	2002	620	19060	6903	0.5	20	22.0	30	13.0	7.14	167
1330	180.0	14.4	11	1597	220	7780	7601	1999	620	19060	6962	0.5	20	22.0	30	13.0	7.64	167
1345	143.5	14.0	11	1591	220	8120	7574	1996	620	19060	7031	0.5	20	22.0	30	13.0	7.70	167
1400	111.0	13.4	11	1597	220	7910	7589	1998	620	19060	7080	0.5	20	22.0	30	13.5	7.42	167
1415	362.0	12.7	11	1602	240	8590	7572	1998	620	19060	7146	0.5	20	22.0	30	13.5	6.13	167
1430	327.5	12.3	11	1619	230	8360	7567	2001	620	19060	7201	0.6	20	22.0	29	13.5	6.59	167
1445	293.0	11.9	11	1630	230	8360	7605	2004	620	19060	7265	0.5	20	22.0	29	13.5	5.64	167
1500	258.0	11.6	11	1613	210	7880	7599	1499	620	19060	7327	0.5	20	21.0	29	13.5	7.09	167
1515	223.5	11.3	11	1602	210	7700	7575	2000	620	19060	7388	0.5	20	21.0	29	14.5	6.52	167
1530	188.5	10.9	11	1597	210	7880	7579	1999	620	19060	7451	0.5	20	21.0	29	14.5	6.98	167
1545	153.0	10.6	11	1599	240	8590	0	2000	620	19060	7512	0.4	20	21.0	29	14.5	7.96	167
1600	121.5	10.6	0	1504	220	8120	0	1998	620	19060	7568	0.4	20	21.0	29	14.5	5.10	168
Ave:	257.7	15.5	9.8	1598.1	244.6	8393.6	6509.7	1973.6	615.7	19060.0	6747.3	0.6	20.0	22.6	29.8	12.9	6.79	166.9
Min:	108.0	10.6	0.0	1504.0	200.0	2360.0	0.0	1499.0	570.0	19060.0	5821.0	0.4	20.0	21.0	29.0	11.5	5.10	165.0
Max:	391.0	19.8	11.0	1630.0	420.0	14370.0	7638.0	2012.0	630.0	19060.0	7568.0	1.5	20.0	25.0	30.0	14.5	8.24	168.0

Test 10
9-20-88

ID Fan Inlet ("wc)	Kiln Pressure ("wc)	AB Pressure ("wc)	Quench Water Flow (gpm)	AB Exit O2 (%)	AB Exit CO (ppm)	AB Exit CO2 (%)	AB Exit UTHC (ppm)	Kiln Exit O2 (%)	Scrubber Exit CO (ppm)	Scrubber Exit CO2 (%)	Scrubber Exit NOx (ppm)	Scrubber Exit HTHC (ppm)	Scrubber Exit UTHC (ppm)	Stack O2 (%)	Stack CO (ppm)	Stack CO2 (%)	Stack HTHC (ppm, CH4)
34.0	0.010	0.12	18	8.4	0.0	7.7	-0.3	12.1	1.0	5.5	49.0	0.2	0.7	13.8	0.0	6.0	-0.5
34.0	0.010	0.12	18	8.6	0.0	7.7	-0.3	12.1	2.0	5.6	49.0	0.1	0.8	14.0	0.0	5.9	-0.5
34.0	0.020	0.10	18	6.7	0.0	9.4	0.1	13.4	1.0	7.1	57.0	0.2	0.3	12.9	0.0	7.1	0.2
34.0	0.020	0.10	14	7.4	0.0	8.8	0.5	10.9	1.0	6.5	59.0	0.2	0.6	13.5	0.0	6.2	0.3
34.0	0.020	0.10	14	7.3	0.0	9.3	0.2	10.7	1.0	6.4	49.0	0.0	0.7	13.5	0.0	6.4	0.2
33.0	0.020	0.10	14	7.2	0.0	9.4	0.5	10.8	2.0	6.4	51.0	-0.2	0.6	13.5	0.0	6.4	-0.2
33.0	0.020	0.10	14	7.4	0.0	9.0	0.3	11.1	1.0	6.4	52.0	-0.3	0.8	13.7	0.0	6.2	-0.7
33.0	0.020	0.10	14	7.5	0.0	8.8	0.6	161.0	0.0	6.2	52.0	-0.2	0.6	13.7	0.0	6.2	0.2
33.0	0.020	0.10	14	7.6	0.0	8.6	1.3	11.2	1.0	6.3	51.0	-0.3	0.6	13.8	0.0	6.2	-0.2
33.0	0.020	0.10	14	7.3	0.0	9.1	3.1	11.1	1.0	6.3	56.0	-0.3	0.6	13.5	0.0	6.4	-0.7
32.0	0.020	0.10	14	7.2	0.0	6.9	-1.3	11.0	0.0	6.3	61.0	-0.2	2.3	13.8	0.0	5.9	-0.2
33.0	0.020	0.12	14	7.9	0.0	9.1	1.8	11.2	1.0	6.4	54.0	-0.2	0.8	13.7	0.0	6.4	-0.6
32.0	0.020	0.12	14	7.6	0.0	9.1	1.0	11.3	2.0	6.5	51.0	-0.5	0.7	13.6	0.0	6.5	-0.6
33.0	0.020	0.10	14	8.2	0.0	8.7	1.0	12.5	0.0	6.1	55.0	-0.4	0.7	13.9	0.0	6.1	-0.4
32.0	0.020	0.10	14	7.4	0.0	9.0	1.6	11.4	1.0	6.4	58.0	-0.3	0.6	13.6	0.0	6.3	-0.7
32.0	0.020	0.10	14	7.5	0.0	9.1	1.4	11.5	0.0	6.5	55.0	-0.3	0.6	13.7	0.0	6.2	-0.4
32.0	0.020	0.10	14	7.4	0.0	8.9	1.4	11.7	0.0	6.4	54.0	-0.3	0.6	13.8	0.0	6.2	-0.4
32.0	0.020	0.10	14	7.8	0.0	9.0	1.8	11.7	1.0	6.2	56.0	-0.5	2.8	13.6	0.0	6.1	-0.4
32.0	0.020	0.10	14	7.7	0.0	8.8	1.7	11.7	2.0	6.3	53.0	-0.6	1.2	13.7	0.0	6.3	-0.7
32.0	0.020	0.10	14	7.6	0.0	8.8	3.8	11.8	1.0	6.1	61.0	-0.6	1.1	13.7	0.0	6.4	-1.4
32.0	0.020	0.10	14	7.6	0.0	8.6	3.4	11.7	1.0	6.4	54.0	-0.5	0.6	13.6	0.0	6.3	-0.2
32.0	0.020	0.10	14	7.2	0.0	9.0	4.2	11.3	1.0	6.3	54.0	-0.6	0.9	13.6	0.0	6.4	-0.2
32.0	0.020	0.12	14	7.6	0.0	8.7	4.8	11.1	0.0	6.3	55.0	-0.7	0.6	13.6	0.0	6.3	-0.4
32.0	0.020	0.10	14	7.7	0.0	9.0	3.0	11.7	3.0	6.4	51.0	-0.7	0.9	13.6	0.0	6.4	-0.6
33.0	0.020	0.10	14	7.7	0.0	8.7	2.4	11.6	1.0	5.2	43.0	-0.6	0.7	13.8	0.0	6.2	-0.2
33.0	0.020	0.10	14	7.9	0.0	8.5	2.5	11.6	2.0	6.1	53.0	-0.7	0.6	13.4	0.0	6.4	-0.5
33.0	0.020	0.10	14	7.4	0.0	9.1	3.3	11.1	1.0	6.5	45.0	-0.8	0.6	13.1	0.0	6.5	-0.6
33.0	0.020	0.10	14	9.9	0.0	6.9	3.2	11.4	1.0	4.8	55.0	-0.8	0.8	14.0	0.0	5.3	-0.4
Ave: 32.8	0.019	0.10	14.4	7.7	0.0	8.8	1.7	16.8	1.0	6.2	53.3	-0.4	0.8	13.6	0.0	6.3	-0.4
Min: 32.0	0.010	0.10	14.0	6.7	0.0	6.9	-1.3	10.7	0.0	4.8	43.0	-0.8	0.3	12.9	0.0	5.3	-1.4
Max: 34.0	0.020	0.12	18.0	9.9	0.0	9.4	4.8	161.0	3.0	7.1	61.0	0.2	2.8	14.0	0.0	7.1	0.3

Test 11
9-22-88

Time	Clay Feed Weight Reading (lbs)	Metals Feed Weight Reading (lbs)	Feed Metals Rotometer	Kiln Exit Temp (°F)	Kiln Gas Flow (scfh)	Kiln Air Flow (scfh)	Kiln Aux Air Flow (scfh)	AB Exit Temp (°F)	AB Gas Flow (scfh)	AB Air Flow (scfh)	Make-up Water Cum. (gal)	Blowdown Water (gpm)	Venturi Flow (gpm)	Venturi Pressure (°wc)	Packed Column Flow (gpm)		Packed Column Pressure (°wc)	Liquor pH	Liquor Temp (°F)
907	364.5	23.3	0	1581	1120	14400	0	1986	520	18450	8191	0.7	20	25.0	30		13.5	7.04	165
915	357.0	23.2	11	1576	290	10490	7601	2003	620	19060	8218	0.7	20	23.0	30		13.0	7.36	167
930	320.5	22.8	11	1589	290	10250	7593	1994	610	19060	8277	0.8	20	23.0	30		13.5	6.45	168
945	284.5	22.5	11	1587	270	9540	7594	1989	610	19060	8342	0.6	20	23.0	30		14.0	7.75	168
1000	248.5	22.1	11	1589	270	9540	7559	1986	620	19060	8405	0.6	20	23.0	30		15.0	7.01	167
1015	213.5	21.7	11	1589	270	9780	7562	2006	620	19060	8077	0.6	20	23.0	30		15.0	6.72	168
1030	178.0	21.3	11	1605	270	9540	7563	2000	620	19060	8529	0.6	20	23.0	30		15.0	7.88	168
1045	142.5	20.9	11	1600	260	9300	7562	1999	620	19060	8595	0.7	20	22.0	30	>	15.0	8.40	168
1100	107.0	20.4	11	1591	260	9540	7542	2001	620	19060	8651	0.7	20	22.0	29	>	15.0	7.47	168
1115	72.0	20.0	11	1585	260	9540	7549	1999	620	19060	8713	0.7	19	21.0	29	>	15.0	7.49	168
1130	376.0	19.8	11	1584	260	9540	7530	1999	620	19060	8776	0.7	19	21.0	29	>	15.0	7.46	167
1145	240.5	19.3	11	1586	260	7340	7543	1997	620	19060	8842	0.7	19	21.0	29	>	15.0	7.22	168
1200	306.0	18.9	11	1587	260	9540	7526	1997	620	19060	8904	0.7	19	21.0	29	>	15.0	7.87	168
1215	271.0	18.4	11	1589	260	9300	7549	1998	620	19060	8964	0.7	19	21.0	29	>	15.0	8.37	168
1230	236.0	18.0	11	1589	250	9300	7541	1996	620	19060	9026	0.7	19	20.0	29	>	15.0	7.07	168
1245	201.0	17.4	11	1586	260	9300	7527	1995	620	19060	9087	0.7	19	20.0	29	>	15.0	5.84	168
1300	165.5	16.9	11	1587	270	9540	7551	1994	620	19060	9161	0.7	19	20.0	29	>	15.0	4.99	167
1315	131.5	16.5	11	1602	260	9540	7595	1996	620	19060	9215	0.7	19	20.0	29	>	15.0	8.18	168
1330	97.0	16.1	11	1607	270	9750	7565	1996	620	19060	9272	0.7	19	20.0	29	>	15.0	8.13	168
1345	62.0	15.7	11	1612	270	9780	7579	1999	620	19060	9339	0.7	19	20.0	29	>	15.0	8.35	168
1400	384.0	15.3	11	1587	260	9546	13455	2000	620	19060	9396	0.7	19	20.0	29	>	15.0	7.52	168
1415	345.0	14.9	11	1491	270	9540	13385	1997	620	19060	9972	0.7	19	20.0	29	>	15.0	7.79	170
1430	341.0	14.6	11	1392	270	9750	13461	1979	630	19060	9530	0.6	19	20.0	29	>	15.0	7.94	171
1445	279.5	14.1	11	1366	180	4310	13383	1805	90	5640	9601	0.6	19	20.0	29	>	15.0	8.49	161
1500	246.5	13.4	11	1249	150	3740	3240	1502	80	5740	9648	0.4	19	16.0	29		6.5	8.19	158
1515	208.5	12.9	11	1226	180	4050	3238	1451	80	6520	9673	0.4	19	16.0	29		6.5	7.68	157
1530	169.5	12.3	11	1292	190	3940	3238	1416	80	6850	9708	0.4	19	16.0	29		6.5	7.20	156
1545	147.0	12.0	0	1626	400	10250	0	1657	620	19060	9797	0.4	19	16.0	29		6.0	8.19	167
Ave:	232.0	18.0	10.2	1537.5	291.4	8927.5	7394.0	1919.2	539.6	17199.3	8996.0	0.6	19.3	20.6	29.3		13.6	7.50	166.5
Min:	62.0	12.0	0.0	1226.0	150.0	3740.0	0.0	1416.0	80.0	5640.0	8077.0	0.4	19.0	16.0	29.0		6.0	4.99	156.0
Max:	384.0	23.3	11.0	1626.0	1120.0	14400.0	13461.0	2006.0	630.0	19060.0	9972.0	0.8	20.0	25.0	30.0		15.0	8.49	171.0

Test 11
9-22-88

	ID Fan Inlet ("wc)	Kiln Pressure ("wc)	AB Pressure ("wc)	Quench Water Flow (gpm)	AB Exit O2 (%)	AB Exit CO (ppm)	AB Exit CO2 (%)	AB Exit UTHC (ppm)	Kiln Exit O2 (%)	Scrubber Exit CO (ppm)	Scrubber Exit CO2 (%)	Scrubber Exit NOx (ppm)	Scrubber Exit HTHC (ppm)	Scrubber Exit UTHC (ppm)	Stack O2 (%)	Stack CO (ppm)	Stack CO2 (%)	Stack HTHC (ppm, CH4)
	36.0	0.020	0.10	18	8.7	0.0	7.5	1.2	12.0	1.0	5.3	37.0	1.0	1.9	12.4	54.0	6.8	-0.5
	33.0	0.020	0.12	18	6.6	1.0	9.3	1.2	12.1	1.0	6.6	51.0	0.9	1.6	11.1	44.0	8.0	0.0
	34.0	0.020	0.12	18	7.6	1.0	8.9	0.6	10.9	2.0	6.0	40.0	1.1	1.7	11.7	42.0	7.5	-0.4
	34.0	0.020	0.12	18	7.7	0.0	8.6	-0.3	10.9	1.0	5.9	43.0	0.9	1.1	11.8	31.0	7.4	-0.2
	34.0	0.020	0.12	18	7.5	0.0	8.9	-0.6	11.2	3.0	5.9	46.0	0.6	1.0	11.9	47.0	7.4	-0.6
	34.0	0.020	0.12	18	7.4	0.0	8.9	-0.7	11.3	3.0	6.2	45.0	0.8	0.9	11.8	39.0	7.6	-0.2
	34.0	0.020	0.12	18	7.2	0.0	9.1	-0.8	10.9	4.0	6.0	46.0	0.8	1.1	11.8	55.0	74.0	-0.8
	34.0	0.020	0.12	18	7.2	0.0	9.2	-0.9	11.1	3.0	5.7	44.0	0.7	1.0	12.1	37.0	7.3	-0.4
	34.0	0.020	0.12	18	7.6	0.0	8.8	0.1	11.4	3.0	5.9	46.0	0.9	0.9	11.9	32.0	7.4	-0.2
	34.0	0.020	0.12	18	7.7	0.0	8.8	0.5	11.4	4.0	5.7	45.0	0.7	0.6	12.0	16.0	7.2	0.1
	34.0	0.020	0.12	18	7.7	0.0	8.8	0.6	11.5	3.0	5.8	45.0	0.6	0.8	11.9	17.0	7.3	-0.5
	34.0	0.020	0.12	18	7.8	0.0	8.7	-2.6	11.4	3.0	5.7	47.0	0.3	0.6	11.9	28.0	7.3	-0.2
	34.0	0.020	0.12	18	7.6	0.0	8.9	-3.0	11.5	3.0	6.0	50.0	0.3	0.7	11.9	12.0	7.3	-0.9
	34.0	0.020	0.12	18	7.8	0.0	8.6	-0.8	11.3	1.0	6.0	51.0	0.1	0.6	11.9	20.0	7.3	-0.5
	34.0	0.020	0.12	18	7.6	6.0	8.6	1.6	11.6	4.0	5.9	48.0	0.3	0.7	12.0	21.0	7.3	-0.6
	34.0	0.030	0.12	18	7.8	0.0	8.6	1.1	11.5	4.0	6.0	51.0	0.2	0.2	12.0	12.0	7.2	0.0
	34.0	0.025	0.12	18	7.7	0.0	9.1	1.1	11.5	3.0	6.1	49.0	0.2	0.2	11.9	18.0	7.4	0.0
	34.0	0.020	0.12	18	7.5	0.0	8.7	-0.3	11.4	4.0	5.8	49.0	-0.2	0.3	11.9	33.0	7.3	-0.1
	34.0	0.020	0.12	18	7.7	0.0	8.5	0.2	11.3	3.0	6.0	46.0	-0.1	0.2	12.0	40.0	7.3	-0.2
	34.0	0.020	0.12	18	7.5	0.0	8.8	-0.4	11.4	2.0	6.0	47.0	0.0	0.3	11.9	54.0	7.4	-0.4
	34.0	0.020	0.12	18	8.0	0.0	8.5	-0.6	11.5	3.0	5.8	48.0	0.4	0.6	12.0	41.0	7.3	0.1
	36.0	0.010	0.12	18	7.3	0.0	8.8	-0.1	12.0	2.0	5.8	42.0	0.1	0.1	12.1	28.0	7.4	-0.7
	36.0	0.000	0.10	18	7.1	0.0	9.2	-6.0	11.7	2.0	6.2	42.0	-0.2	0.2	11.7	20.0	7.5	-0.6
	37.0	0.100	0.38	18	14.4	33.0	3.0	-4.5	14.0	11.0	2.1	17.0	0.4	1.4	16.7	33.0	3.1	-1.1
	21.0	0.100	0.22	18	15.0	20.0	3.7	-0.7	15.6	20.0	2.4	22.0	0.0	1.5	17.0	45.0	3.7	-0.5
	21.0	0.100	0.22	18	14.6	49.0	4.3	1.1	14.5	33.0	3.0	24.0	0.7	1.3	16.5	70.0	3.9	-0.8
	21.0	0.100	0.22	18	14.0	98.0	4.6	-65.0	14.1	70.0	3.3	23.0	3.1	1.4	16.2	97.0	4.1	0.2
	20.0	0.060	0.12	18	5.2	0.0	9.8	-63.0	10.4	2.0	6.8	49.0	0.2	-0.1	10.0	278.0	7.8	-3.1
Ave:	32.4	0.035	0.14	18.0	8.5	7.5	8.1	-5.0	11.8	7.1	5.5	42.6	0.6	0.8	12.5	45.1	9.2	-0.5
Min:	20.0	0.000	0.10	18.0	5.2	0.0	3.0	-65.0	10.4	1.0	2.1	17.0	-0.2	-0.1	10.0	12.0	3.1	-3.1
Max:	37.0	0.100	0.38	18.0	15.0	98.0	9.8	1.6	15.6	70.0	6.8	51.0	3.1	1.9	17.0	278.0	74.0	0.2

Test 3
9-26-88

Time	Clay Feed Weight Reading (lbs)	Metals Feed Weight Reading (lbs)	Feed Metals Rotameter	Kiln Exit Temp (°F)	Kiln Gas Flow (scfh)	Kiln Air Flow (scfh)	Kiln Aux Air Flow (scfh)	AB Exit Temp (°F)	AB Gas Flow (scfh)	AB Air Flow (scfh)	Make-up Water Cum. (gal)	Blowdown Water (gpm)	Venturi Flow (gpm)	Venturi Pressure ("wc)	Packed Column Flow (gpm)		Packed Column Pressure ("wc)	Liquor pH	Liquor Temp (°F)
845	375.5	10.4	0	1610	420	14950	0	1984	560	19060	6032	0.7	19	25.0	28		12.0	7.14	165
900	348.5	10.0	11	1541	280	5990	7692	2000	670	19060	6104	0.7	19	25.0	28		12.5	6.86	166
915	314.0	9.7	11	1583	280	6230	7679	1977	630	19060	6157	0.4	15	20.0	21	>	15	8.06	168
930	280.0	9.2	11	1586	360	12490	7664	2011	630	18130	6221	0.7	12	18.0	18	>	15	9.60	151
945	278.0	9.3	0	1581	440	15010	7656	1942	630	17960	6282	0.8	15	20.0	21	>	15	6.93	165
1000	270.0	9.3	0	955	180	2620	0	1609	300	8140	6361	1.6	23	23.0	35	>	15	7.61	144
1015	261.0	9.0	11	1604	350	12480	0	1970	630	18040	6409	1.4	20	22.0	29		14.0	8.63	167
1030	227.0	8.5	11	1596	310	10080	7639	2003	630	18100	6481	1.4	20	22.0	29		14.5	8.42	168
1045	193.0	8.1	11	1592	290	10520	9645	2003	620	17530	6551	1.4	20	22.0	29	>	15	5.95	167
1100	159.0	7.0	11	1597	280	10340	7617	1999	610	17520	6617	0.8	20	22.0	29		14.5	6.64	167
1115	125.0	6.5	11	1603	280	10090	7599	2001	610	17540	6680	0.7	20	22.0	29		14.5	6.47	167
1130	91.0	6.1	11	1592	260	9630	7600	2004	610	17550	6741	0.6	20	22.0	29		14.0	7.24	167
1145	267.5	5.7	11	1584	310	10720	7610	2004	620	17500	6807	0.6	20	22.0	29		14.5	7.85	168
1200	334.0	5.2	11	1580	280	10100	7594	2004	610	17540	6867	0.5	20	22.0	29		14.5	8.07	168
1215	300.0	4.8	11	1607	290	10350	7591	2007	610	17470	6926	0.5	20	22.0	29		14.5	8.14	168
1230	266.5	4.4	11	1605	270	9730	7620	2004	610	17510	6983	0.5	20	22.0	29		14.5	6.95	168
1245	232.5	3.9	11	1592	270	9700	7601	2008	610	17490	7048	0.5	20	22.0	29		14.5	7.69	168
1300	198.5	3.4	11	1587	270	9720	7588	2009	610	17440	7104	0.4	20	22.0	29		14.5	8.08	109
1315	164.5	3.0	11	1598	270	9700	7577	2004	600	17720	7170	0.4	20	22.0	29		14.5	8.26	168
1330	131.0	2.5	11	1595	270	9600	7623	2000	600	17700	1230	0.4	20	22.0	29		15.0	7.89	168
1345	96.5	2.4	0	1603	260	9630	7600	2021	590	17410	7208	0.4	20	22.0	28		15.0	7.32	167
Ave:	234.3	6.6	8.9	1561.9	296.2	10026.7	6629.5	1979.6	597.1	17407.1	6303.0	0.7	19.2	22.0	27.9	0.0	14.4	7.61	162.6
Min:	91.0	2.4	0.0	955.0	180.0	2620.0	0.0	1609.0	300.0	8140.0	1230.0	0.4	12.0	18.0	18.0	0.0	12.0	5.95	109.0
Max:	375.5	10.4	11.0	1610.0	440.0	15010.0	9645.0	2021.0	630.0	19060.0	7208.0	1.6	23.0	25.0	35.0	0.0	15.0	9.60	168.0

Test 3
9-26-88

	ID Fan Inlet ("wc)	Kiln Pressure ("wc)	AB Pressure ("wc)	Quench Water Flow (gpm)	AB Exit O2 (%)	AB Exit CO (ppm)	AB Exit CO2 (%)	AB Exit UTHC (ppm)	Kiln Exit O2 (%)	Scrubber Exit CO (ppm)	Scrubber Exit CO2 (%)	Scrubber Exit NOx (ppm)	Scrubber Exit HTHC (ppm)	Scrubber Exit UTHC (ppm)	Stack O2 (%)	Stack CO (ppm)	Stack CO2 (%)	Stack HTHC (ppm, CH4)
	35.0	0.020	0.12	10	0.7	0.0	7.6	0.5	12.4	1.0	5.4	42.0	0.2	0.9	12.6	426.0	7.3	0.1
	35.0	0.020	0.10	10	7.7	0.0	9.2	0.2	11.6	0.0	6.2	46.0	0.3	0.2	1190.0	0.0	0.3	0.6
	34.0	0.020	0.10	10	7.5	0.0	9.3	0.4	10.0	0.0	6.2	41.0	-0.3	0.2	12.1	0.0	0.2	-0.7
	35.0	0.100	0.10	10	17.0	7.0	0.5	3.2	12.3	132.0	0.2	2.0	2.7	4.6	16.6	73.0	0.7	11.2
	37.0	0.020	0.06	10	0.1	0.0	0.1	0.0	12.7	1.0	5.4	45.0	-0.6	1.3	12.6	0.0	7.3	-1.3
	37.0	0.025	0.12	10	19.5	34.0	2.2	5.2	17.7	5.0	1.6	17.0	0.0	0.9	19.6	0.0	2.5	1.2
	34.0	0.020	0.10	10	7.0	0.0	9.0	0.6	11.0	2.0	6.5	39.0	-0.9	-0.2	11.5	0.0	7.7	-1.4
	34.0	0.010	0.12	10	6.0	0.0	9.4	0.5	11.5	3.0	6.2	42.0	-0.9	-0.6	11.7	0.0	0.2	-1.4
	34.0	0.020	0.12	10	7.2	0.0	9.5	0.0	11.3	2.0	6.3	40.0	-1.1	-0.3	11.9	0.0	7.7	-1.7
	34.0	0.020	0.12	10	7.3	0.0	0.9	0.6	11.5	0.0	6.2	39.0	-1.1	-0.2	12.0	0.0	7.4	-1.7
	34.0	0.020	0.12	14	7.3	0.0	9.4	0.0	11.5	2.0	5.9	41.0	-1.3	0.2	11.9	0.0	7.4	0.2
	34.0	0.020	0.12	10	7.5	0.0	9.3	0.9	11.4	0.0	6.1	43.0	-1.1	-0.6	12.0	0.0	7.5	-0.9
	34.0	0.010	0.12	10	7.3	0.0	9.3	0.9	11.6	2.0	6.1	39.0	-1.0	-0.2	11.9	0.0	7.0	-1.6
	34.0	0.010	0.12	10	7.5	0.0	9.2	0.0	11.6	1.0	6.0	43.0	-1.1	-0.1	12.0	0.0	7.6	-1.5
	34.0	0.020	0.12	10	7.1	0.0	9.2	0.6	11.4	2.0	6.1	42.0	-1.1	-0.2	11.9	0.0	7.7	-1.0
	34.0	0.020	0.12	10	7.3	0.0	0.9	0.3	11.3	2.0	6.0	42.0	-1.2	-0.5	12.0	0.0	6.9	-0.8
	34.0	0.020	0.12	10	7.4	0.0	9.0	0.2	11.5	3.0	6.0	42.0	-1.0	-0.6	12.1	0.0	7.4	-1.2
	34.0	0.020	0.12	10	7.4	0.0	9.1	0.9	12.2	2.0	6.2	43.0	-1.1	-0.6	11.7	0.0	7.4	-0.2
	34.0	0.020	0.12	10	7.6	0.0	0.9	1.5	11.3	3.0	6.1	45.0	-1.1	-0.6	11.8	0.0	7.5	-0.1
	34.0	0.020	0.12	10	7.6	0.0	9.0	2.7	11.7	1.0	6.0	43.0	-1.2	-0.6	11.8	0.0	7.7	-1.9
	34.0	0.020	0.12	10	7.9	0.0	0.7	3.3	11.6	3.0	4.0	50.0	-1.2	-0.4	12.1	0.0	6.8	-0.2
Ave:	34.4	0.026	0.11	17.0	0.5	2.0	0.3	1.2	11.9	0.0	5.5	39.3	-0.7	0.1	60.6	23.0	7.0	-0.2
Min:	34.0	0.010	0.06	14.0	6.0	0.0	0.5	0.2	10.0	0.0	0.2	2.0	-1.3	-0.6	11.5	0.0	0.7	-1.9
Max:	37.0	0.100	0.12	10.0	19.5	34.0	9.0	5.2	17.7	132.0	6.5	50.0	2.7	4.6	1190.0	426.0	0.3	11.2

Test 2
9-28-88

Time	Clay Feed Weight Reading (lbs)	Metals Feed Weight Reading (lbs)	Feed Metals Rotometer	Kiln Exit Temp (^oF)	Kiln Gas Flow (scfh)	Kiln Air Flow (scfh)	Kiln Aux Air Flow (scfh)	AB Exit Temp (^oF)	AB Gas Flow (scfh)	AB Air Flow (scfh)	Make-up Water Cum. (gal)	Blowdown Water (gpm)	Venturi Flow (gpm)	Venturi Pressure ("wc)	Packed Column Flow (gpm)	Packed Column Pressure ("wc)	Liquor pH	Liquor Temp (^oF)
843	396.0	11.7	0	1591	400	14030	0	2005	560	19060	4865	0.6	21	25.0	29	12.5	7.23	166
900	372.5	11.3	11	1618	300	10520	7754	2018	540	16020	4934	0.5	20	27.0	29	11.0	7.01	167
915	337.5	10.9	11	1588	220	7810	7749	2000	620	18240	4991	0.5	20	25.0	29	12.5	6.98	166
930	302.5	10.4	11	1579	220	8060	7744	2009	610	18250	5050	0.5	20	25.0	29	12.5	7.03	167
945	267.5	10.0	11	1602	240	8790	7724	2019	610	18080	5111	0.5	20	25.0	29	12.0	6.94	167
1000	232.5	8.9	11	1583	230	8200	7720	2005	600	18490	5168	0.5	20	25.0	28	12.5	6.97	167
1015	198.5	8.4	11	1584	230	8440	7699	2001	650	18440	5230	0.5	20	25.0	28	12.5	7.07	167
1030	164.5	8.0	11	1603	230	8260	7657	2000	600	18490	5295	0.5	20	24.0	28.5	12.5	7.09	166
1045	129.0	7.5	11	1600	230	8230	7679	2000	600	18440	5369	0.5	20	24.0	29	12.5	6.96	167
1100	96.5	7.0	11	1607	230	8420	7610	2000	590	18370	5409	0.5	20	24.0	29	12.5	6.45	167
1115	354.0	6.6	11	1601	230	7980	7639	1949	600	18450	5471	0.5	20	24.0	28	12.5	7.13	166
1130	319.5	6.1	11	1618	220	7810	7621	2001	600	18460	5528	0.5	20	24.0	28	12.5	6.99	166
1145	285.0	5.7	11	1617	230	7810	7612	2006	590	18450	5596	0.5	20	24.0	28	12.5	7.10	166
1200	251.0	5.2	11	1603	210	7330	7625	2004	600	18440	5651	0.5	20	24.0	28	12.5	7.13	166
1215	218.0	4.8	11	1579	210	7390	7579	2001	590	18310	5715	0.5	20	24.0	28	12.5	6.97	167
1230	185.0	4.3	0	1511	220	7670	0	1993	590	18370	5780	0.7	20	24.0	28	12.5	6.94	166
Avg:	256.8	7.9	9.6	1592.8	240.6	8546.9	6713.3	2000.7	596.9	18272.5	5322.7	0.5	20.1	24.6	28.5	12.4	7.00	166.5
Min:	96.5	4.3	0.0	1511.0	210.0	7330.0	0.0	1949.0	540.0	16020.0	4865.0	0.5	20.0	24.0	28.0	11.0	6.45	166.0
Max:	396.0	11.7	11.0	1618.0	400.0	14030.0	7754.0	2019.0	650.0	19060.0	5780.0	0.7	21.0	27.0	29.0	12.5	7.23	167.0

Test 2
9-28-88

	ID Fan Inlet (°wc)	Kiln Pressure (°wc)	AB Pressure (°wc)	Quench Water Flow (gpm)	AB Exit O2 (%)	AB Exit CO (ppm)	AB Exit CO2 (%)	AB Exit UTHC (ppm)	Kiln Exit O2 (%)	Scrubber Exit CO (ppm)	Scrubber Exit CO2 (%)	Scrubber Exit NOx (ppm)	Scrubber Exit HTHC (ppm)	Scrubber Exit UTHC (ppm)	Stack O2 (%)	Stack CO (ppm)	Stack CO2 (%)	Stack HTHC (ppm, CH4)
	35.0	0.020	0.12	18	9.4	0.0	7.1	-0.3	12.7	1.0	5.4	35.0	0.1	1.3	12.2	2.0	6.9	0.6
	35.0	0.020	0.16	18	7.7	0.0	8.0	0.0	10.2	2.0	1.2	22.0	0.5	1.0	11.4	0.0	8.0	-0.8
	35.0	0.020	0.12	18	6.2	2.0	10.1	-0.2	11.3	1.0	6.0	33.0	0.1	1.1	11.6	0.0	7.7	-1.8
	35.0	0.020	0.12	18	7.2	0.0	9.6	-0.2	11.3	1.0	6.1	36.0	0.2	1.6	11.7	0.0	7.7	-1.7
	35.0	0.020	0.12	18	6.8	0.0	9.3	-0.4	11.2	1.0	6.1	34.0	0.0	1.2	11.7	0.0	7.8	-0.9
	35.0	0.020	0.12	18	7.5	0.0	9.5	-0.2	11.4	2.0	5.9	35.0	0.2	1.0	11.9	0.0	7.5	-0.4
	35.0	0.020	0.12	18	7.4	0.0	9.2	-0.5	11.3	0.0	6.2	33.0	0.3	1.3	11.9	0.0	7.9	-0.3
	34.0	0.030	0.12	14	7.4	0.0	9.1	-0.1	11.5	1.0	6.2	36.0	0.3	1.1	12.1	0.0	7.8	-1.3
	34.0	0.020	0.12	18	7.4	0.0	8.8	-0.3	11.3	2.0	6.0	35.0	0.0	1.0	12.1	0.0	7.7	-1.2
	34.0	0.020	0.12	18	7.6	0.0	8.8	-0.3	11.4	2.0	6.0	34.0	0.2	2.1	12.1	0.0	7.5	-2.1
	34.0	0.020	0.12	18	7.5	0.0	9.3	-0.6	11.5	1.0	6.0	34.0	0.0	1.4	12.0	0.0	8.1	-0.9
	34.0	0.020	0.12	18	7.6	0.0	9.0	-0.6	11.1	2.0	6.0	35.0	0.2	1.3	12.0	0.0	7.7	-1.6
	34.0	0.020	0.12	18	7.4	0.0	9.0	0.3	11.0	1.0	5.8	37.0	0.3	1.4	12.0	0.0	7.0	-1.0
	34.0	0.020	0.12	18	7.4	0.0	8.8	-0.2	11.6	0.0	5.9	37.0	0.3	1.3	12.2	0.0	7.3	-1.4
	34.0	0.020	0.12	18	7.6	0.0	8.7	-0.3	11.7	2.0	5.8	38.0	0.2	1.0	12.3	0.0	7.3	-1.2
	34.0	0.050	0.15	14	10.3	0.0	6.4	-0.2	11.5	2.0	4.3	48.0	-0.1	1.0	13.0	0.0	5.6	-1.8
Avg:	34.4	0.023	0.12	17.5	7.6	0.1	8.8	-0.3	11.4	1.3	5.6	35.1	0.2	1.3	12.0	0.1	7.5	-1.1
Min:	34.0	0.020	0.12	14.0	6.2	0.0	6.4	-0.6	10.2	0.0	1.2	22.0	-0.1	1.0	11.4	0.0	5.6	-2.1
Max:	35.0	0.050	0.16	18.0	10.3	2.0	10.1	0.3	12.7	2.0	6.2	48.0	0.5	2.1	13.0	2.0	8.1	0.6

Test 1
9-29-88

Time	Clay Feed Weight Reading (lbs)	Metals Feed Weight Reading (lbs)	Feed Metals Rotometer	Kiln Exit Temp (^{o}F)	Kiln Gas Flow (scfh)	Kiln Air Flow (scfh)	Kiln Aux Air Flow (scfh)	AB Exit Temp (^{o}F)	AB Gas Flow (scfh)	AB Air Flow (scfh)	Make-up Water Cum. (gal)	Blowdown Water (gpm)	Venturi Flow (gpm)	Venturi Pressure ("wc)	Packed Column Flow (gpm)	Packed Column Pressure ("wc)	Liquor pH	Liquor Temp (^{o}F)
846	363.5	3.8	0	1597	410	14270	0	2005	600	19060	1500	0.6	20	25.0	28	13.0	7.08	168
900	344.5	3.1	11	1580	230	8120	7672	2004	630	19060	1555	0.2	20	24.0	28	13.0	6.83	169
915	311.5	2.6	11	1592	230	8120	7664	2008	630	19060	1619	0.7	20	24.0	28	12.5	7.03	167
930	278.5	1.7	11	1593	220	7880	7704	2011	620	19060	1682	0.5	20	24.0	28	13.0	6.48	167
945	245.5	1.0	11	1593	230	7950	7697	2004	610	19060	1742	0.2	20	24.0	28	12.5	7.10	166
1000	211.5	2.8	11	1592	230	8120	7678	2001	610	19060	1811	0.8	20	24.0	28	13.0	7.03	166
1015	177.0	2.2	11	1592	230	8100	7672	2001	600	19060	1868	0.8	20	24.0	28	13.0	7.00	166
1030	142.5	1.8	11	1594	220	7840	7606	1999	610	19060	1935	0.5	20	24.0	28	13.0	7.08	166
1045	108.5	1.3	11	1603	210	7650	7687	2002	600	19060	1996	0.6	20	24.0	28	13.0	7.07	166
1100	292.0	0.8	11	1586	210	7650	7663	1991	610	19060	2056	0.6	20	24.0	28	13.0	7.02	167
1115	257.5	0.4	11	1600	210	7650	7638	2001	600	19060	3118	0.5	20	24.0	28	13.0	6.98	166
1130	222.0	-0.1	11	1622	220	7650	7621	2002	600	19060	2184	0.4	20	24.0	28	13.0	7.00	167
1145	187.5	-0.5	11	1601	210	7650	7596	2001	600	19060	2244	0.4	20	24.0	28	13.0	7.00	167
1200	152.0	-1.0	11	1623	210	7410	7577	2002	600	19060	2306	0.2	20	24.0	28	13.0	7.03	167
1215	116.0	0.0	0	1324	220	7840	7559	1618	0	190	2359	0.5	20	25.0	28	14.0	7.11	155
Avg:	227.3	1.[illegible]	9.5	1579.5	232.7	8260.0	7140.9	1976.7	568.0	17802.0	1998.3	0.5	20.0	24.1	28.0	13.0	6.99	166.0
Min:	108.5	-1.0	0.0	1324.0	210.0	7410.0	0.0	1618.0	0.0	190.0	1500.0	0.2	20.0	24.0	28.0	12.5	6.48	155.0
Max:	363.5	3.8	11.0	1623.0	410.0	14270.0	7704.0	2011.0	630.0	19060.0	3118.0	0.8	20.0	25.0	28.0	14.0	7.11	169.0

Test 1
9-29-88

	ID Fan Inlet ("wc)	Kiln Pressure ("wc)	AB Pressure ("wc)	Quench Water Flow (gpm)	AB Exit O2 (%)	AB Exit CO (ppm)	AB Exit CO2 (%)	AB Exit UTHC (ppm)	Kiln Exit O2 (%)	Scrubber Exit CO (ppm)	Scrubber Exit CO2 (%)	Scrubber Exit NOx (ppm)	Scrubber Exit HTHC (ppm)	Scrubber Exit UTHC (ppm)	Stack O2 (%)	Stack CO (ppm)	Stack CO2 (%)	Stack HTHC (ppm, CH4)
	35.0	0.010	0.12	18	8.3	0.0	7.9	-0.1	12.0	1.0	5.1	41.0	1.0	1.6	13.2	35.0	6.4	0.7
	34.0	0.010	0.12	18	6.9	0.0	9.4	-0.4	10.6	1.0	6.4	38.0	3.4	1.0	11.9	0.0	8.0	2.6
	34.0	0.010	0.12	18	6.9	0.0	9.3	-0.2	10.8	2.0	6.0	38.0	0.6	0.9	11.6	0.0	8.3	1.6
	34.0	0.010	0.12	18	7.1	0.0	9.1	-0.4	10.8	1.0	6.2	37.0	0.2	0.8	11.8	20.0	8.0	-0.7
	34.0	0.010	0.12	18	7.3	0.0	9.0	-0.2	11.1	1.0	6.8	36.0	0.2	0.9	12.0	32.0	7.9	-0.1
	24.0	0.020	0.12	18	7.6	0.0	9.3	0.0	11.2	2.0	6.2	35.0	0.2	0.9	12.0	22.0	5.9	0.9
	34.0	0.020	0.12	18	7.5	0.0	9.3	-0.2	11.1	1.0	6.0	36.0	0.2	0.8	12.1	9.0	7.7	-0.7
	34.0	0.020	0.12	18	7.8	0.0	9.1	0.1	11.4	1.0	6.1	36.0	0.2	0.8	12.9	4.0	7.5	0.1
	34.0	0.020	0.12	18	7.5	0.0	9.0	-0.1	11.3	1.0	6.2	36.0	0.2	0.8	12.1	0.0	7.3	0.7
	34.0	0.020	0.12	18	7.2	0.0	8.3	-0.9	11.4	1.0	5.9	36.0	0.2	0.9	12.2	0.0	7.2	0.4
	34.0	0.020	0.12	18	7.7	0.0	9.2	-0.5	11.2	1.0	5.9	40.0	0.0	0.3	12.0	12.0	7.4	-1.6
	34.0	0.020	0.12	18	7.2	0.0	9.0	-1.1	11.0	0.0	6.4	35.0	0.0	0.8	11.8	1.0	8.1	0.6
	34.0	0.020	0.12	18	7.4	0.0	9.2	-1.3	11.1	0.0	1.1	39.0	0.1	0.6	12.1	6.0	7.5	0.2
	34.0	0.020	0.12	18	7.4	0.0	9.1	-1.4	11.1	0.0	6.3	38.0	0.0	0.9	11.8	0.0	8.0	0.2
	36.0	0.120	0.38	18	10.1	0.0	5.1	-1.1	15.4	9.0	2.8	11.0	0.5	1.8	17.0	0.0	4.3	0.7
Avg:	33.5	0.023	0.14	18.0	7.6	0.0	8.8	-0.5	11.4	1.5	5.6	35.5	0.5	1.0	12.4	9.4	7.3	0.4
Min:	24.0	0.010	0.12	18.0	6.9	0.0	5.1	-1.4	10.6	0.0	1.1	11.0	0.0	0.6	11.6	0.0	4.3	-1.6
Max:	36.0	0.120	0.38	18.0	10.1	0.0	9.4	0.1	15.4	9.0	6.8	41.0	3.4	1.8	17.0	35.0	8.3	2.6

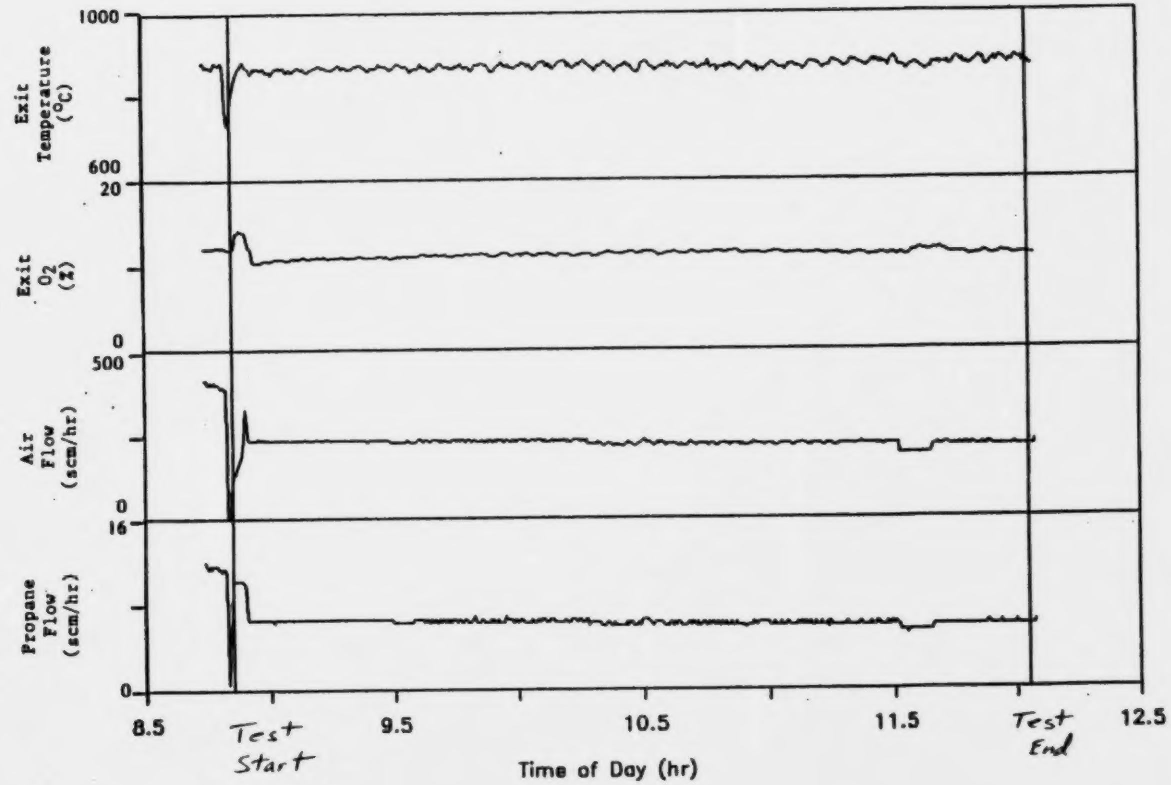

Figure A-1. Kiln operation for Test 1 (9/29/88)

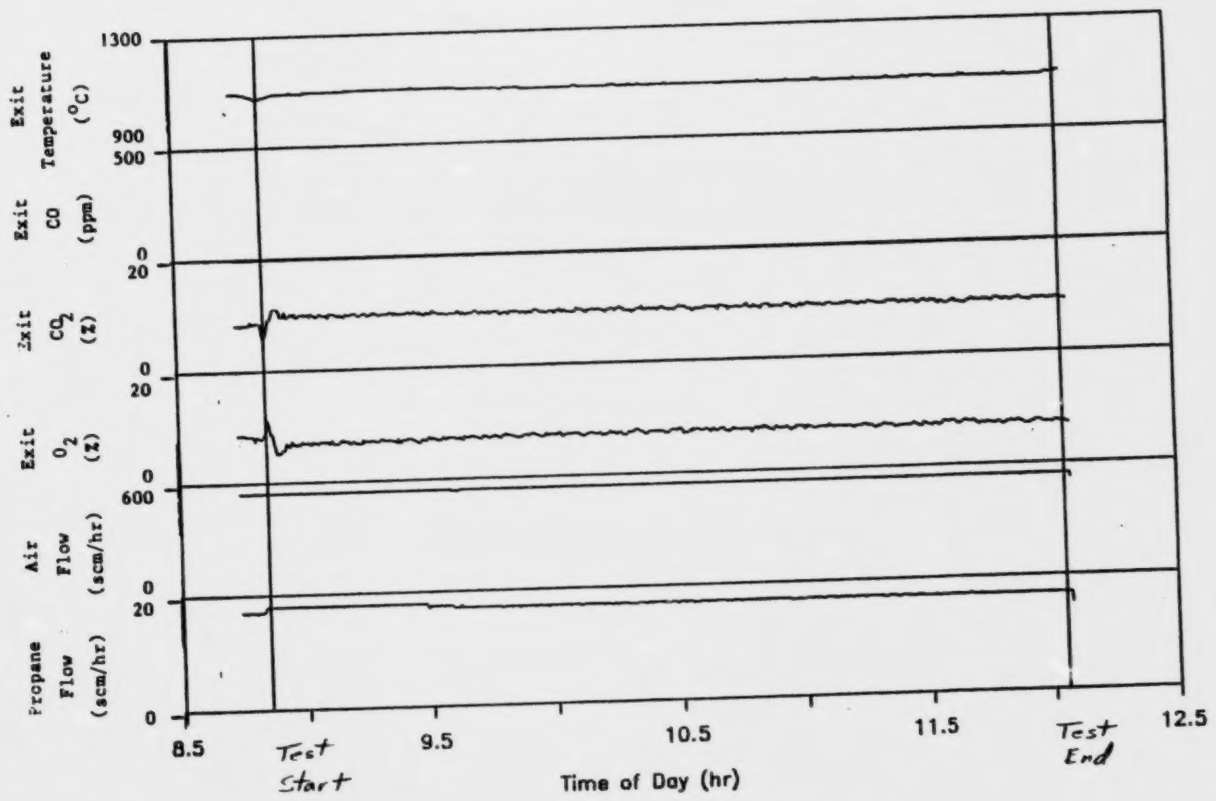

Figure A-2. Afterburner operation for Test 1 (9/29/88)

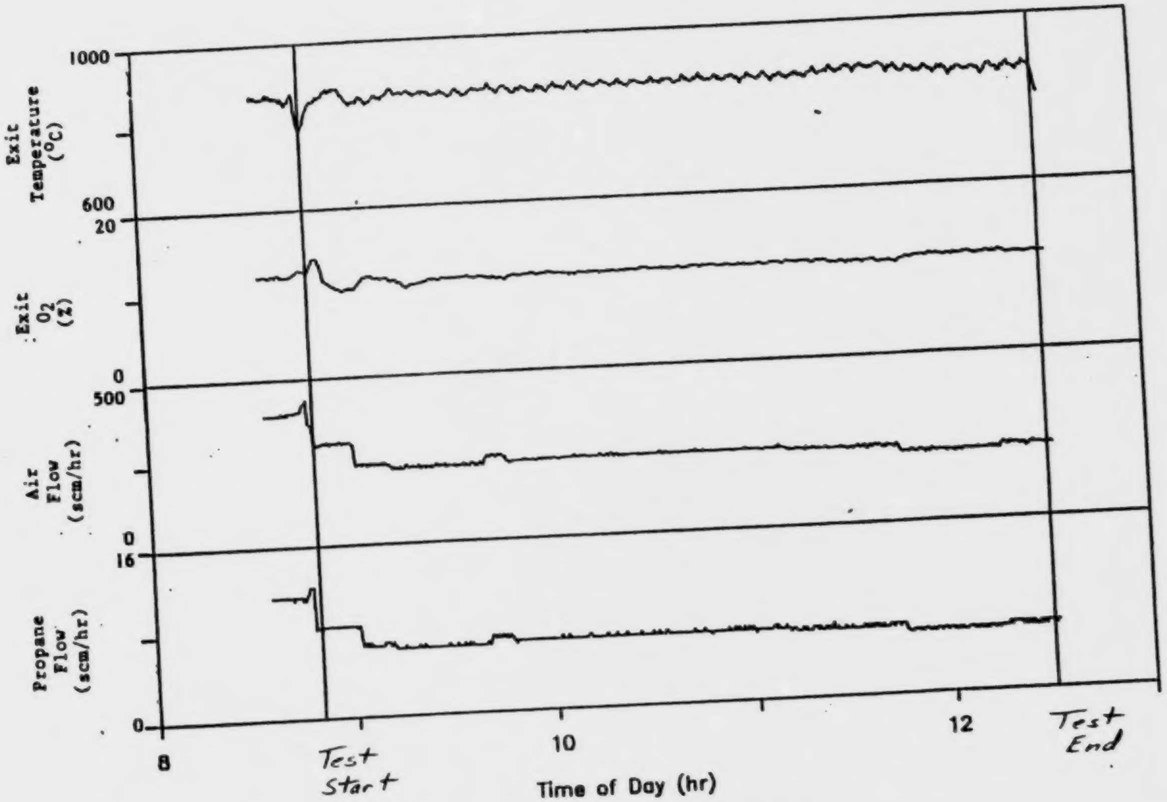

Figure A-3. Kiln operation for Test 2 (9/28/88)

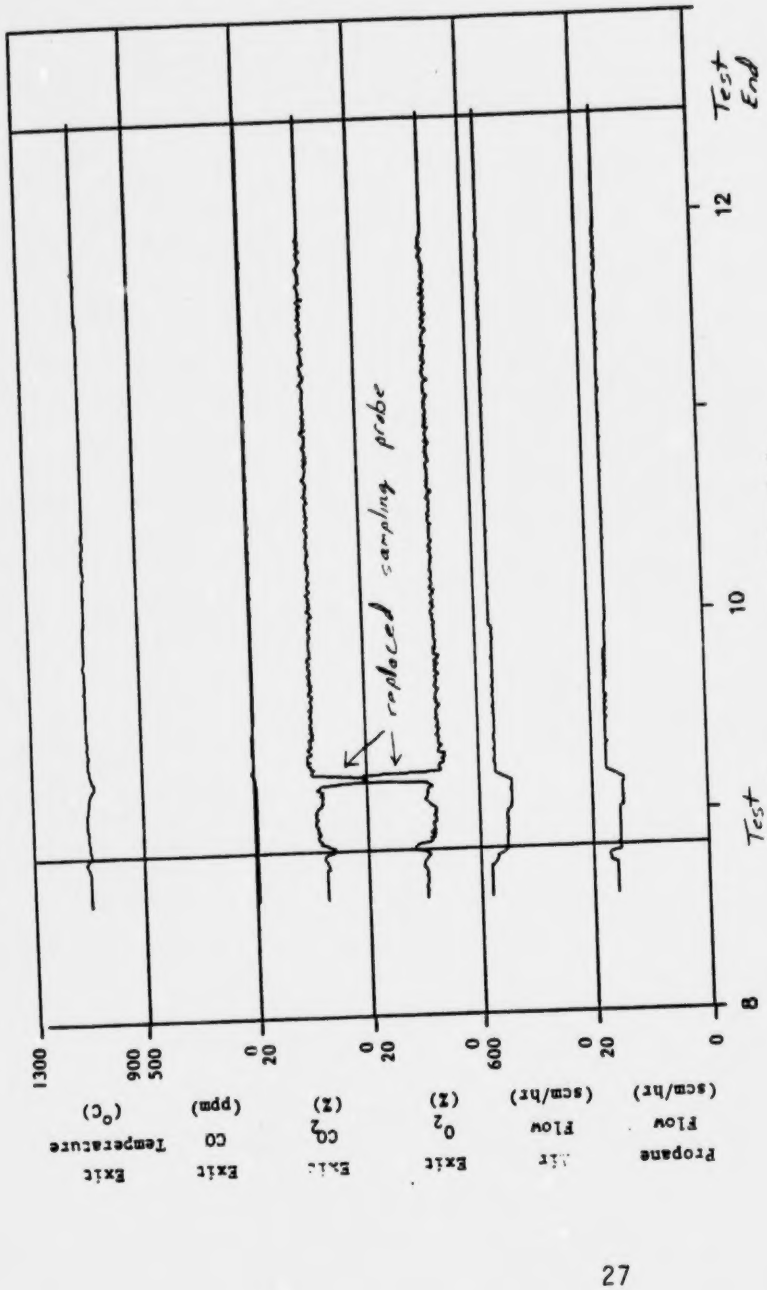

Figure A-4. Afterburner operation for Test 2 (9/28/88)

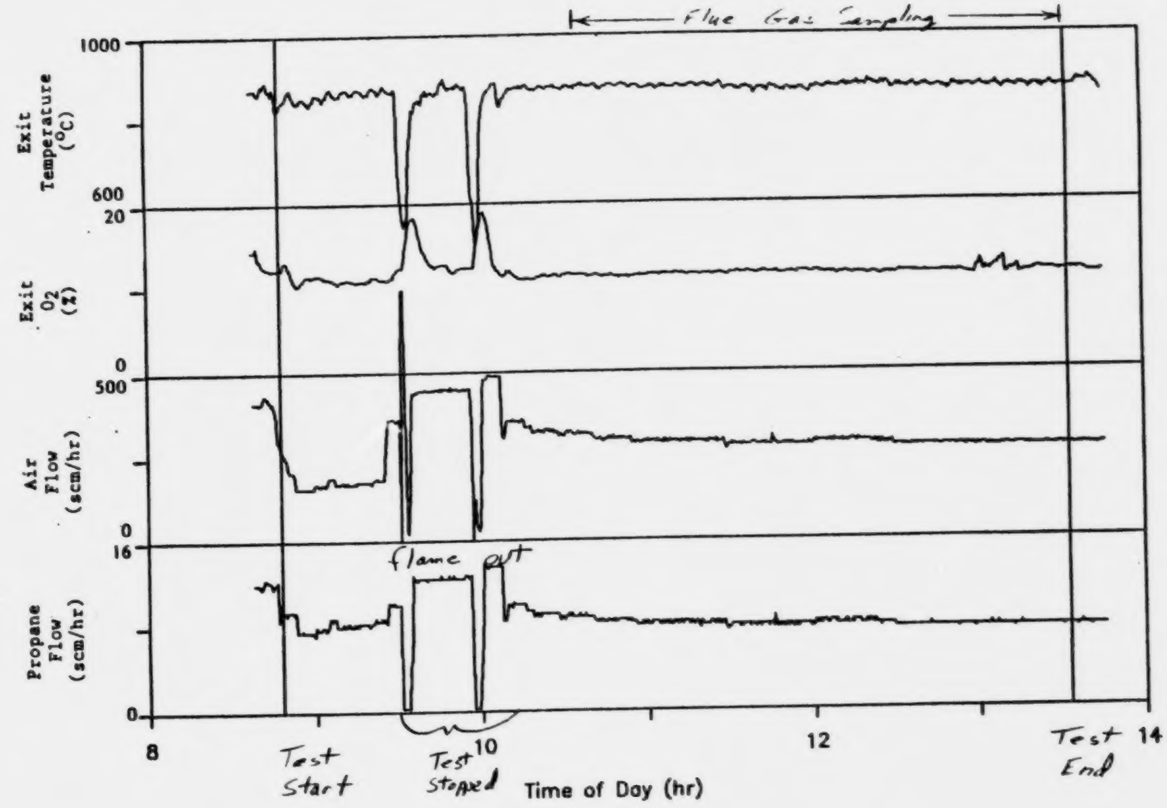

Figure A-5. Kiln operation for Test 3 (9/26/88)

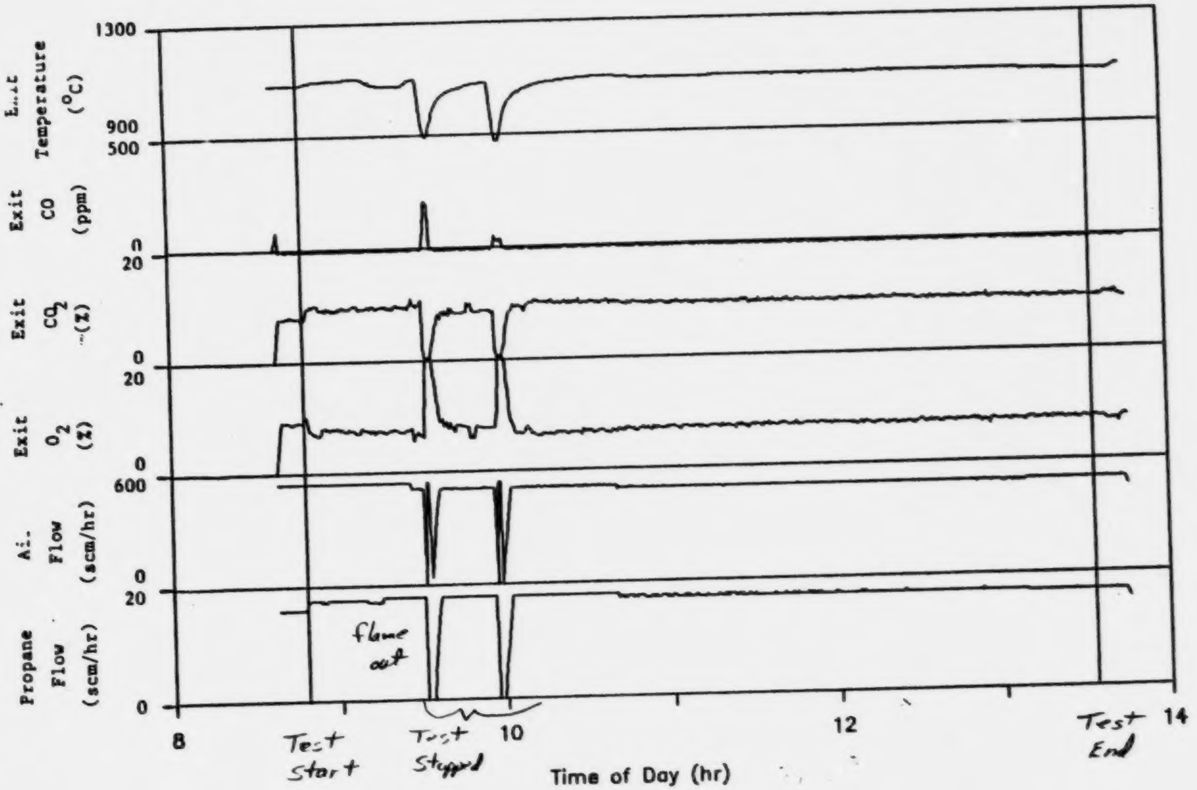

Figure A-6. Afterburner operation for Test 3 (9/26/88)

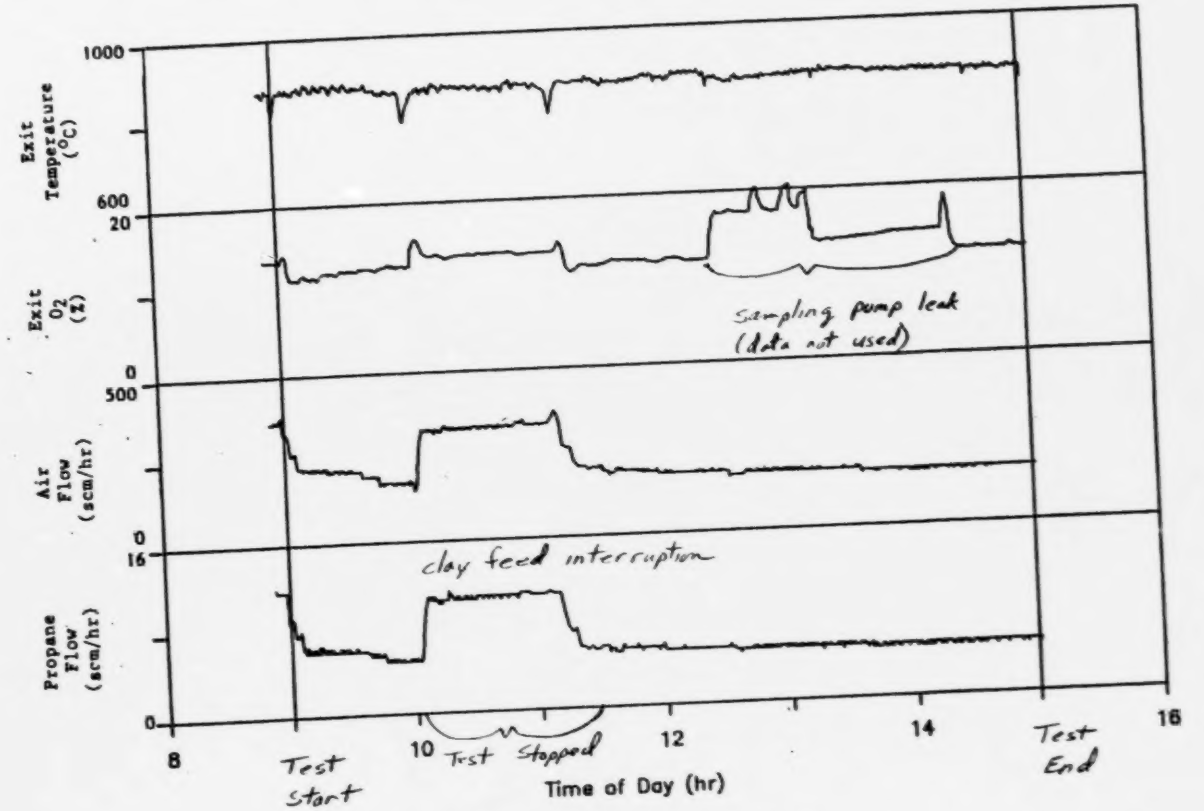

Figure A-7. Kiln operation for Test 4 (9/14/88)

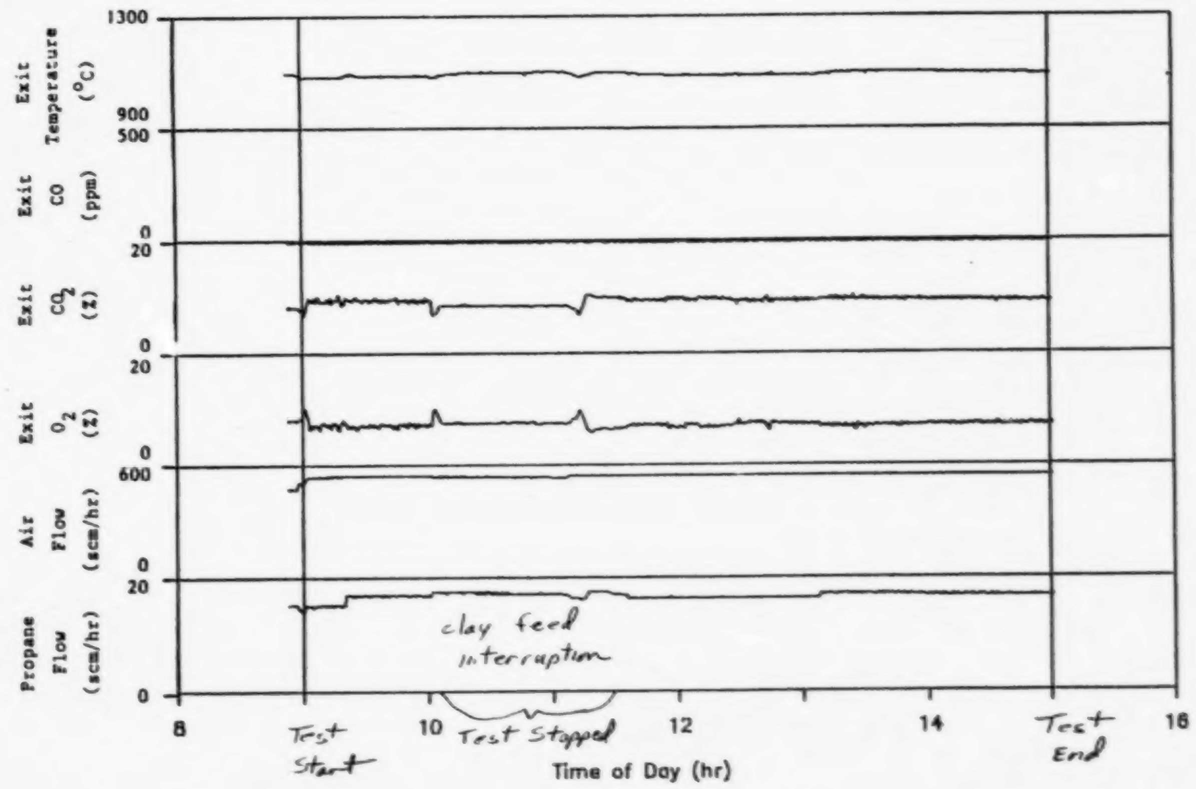

Figure A-8. Afterburner operation for Test 4 (9/14/88)

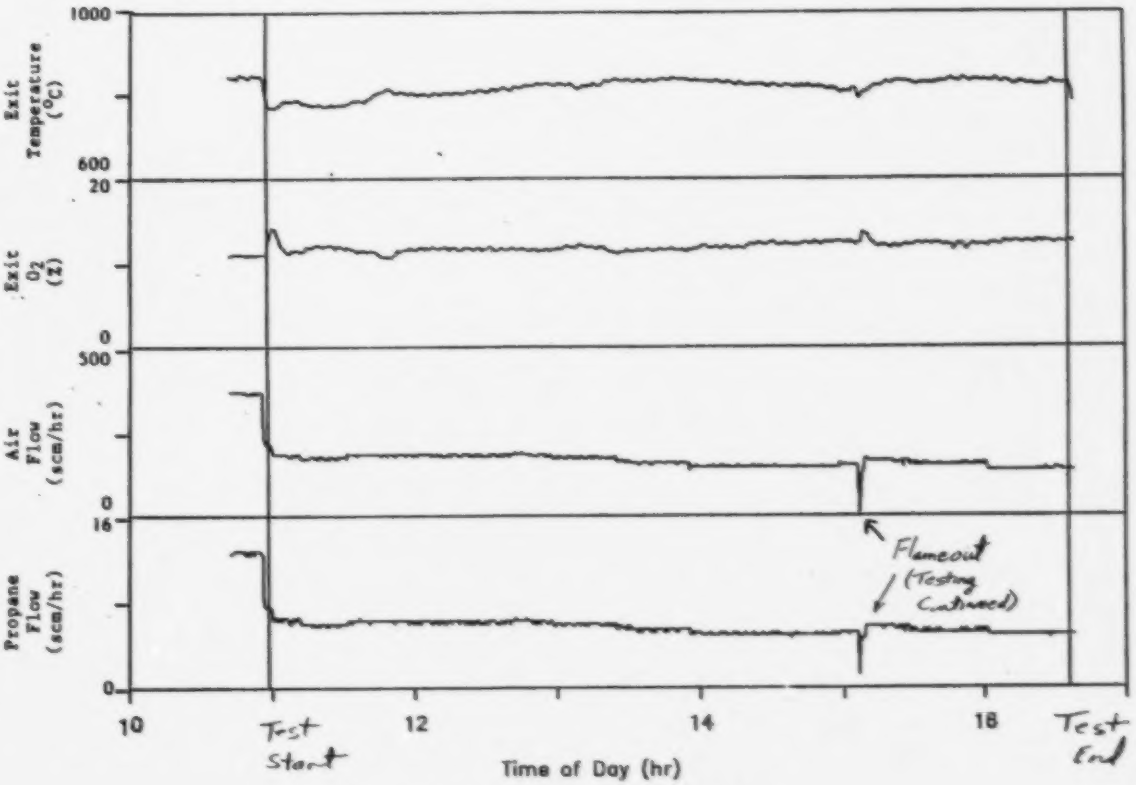

Figure A-9. Kiln operation for Test 5 (8/25/88)

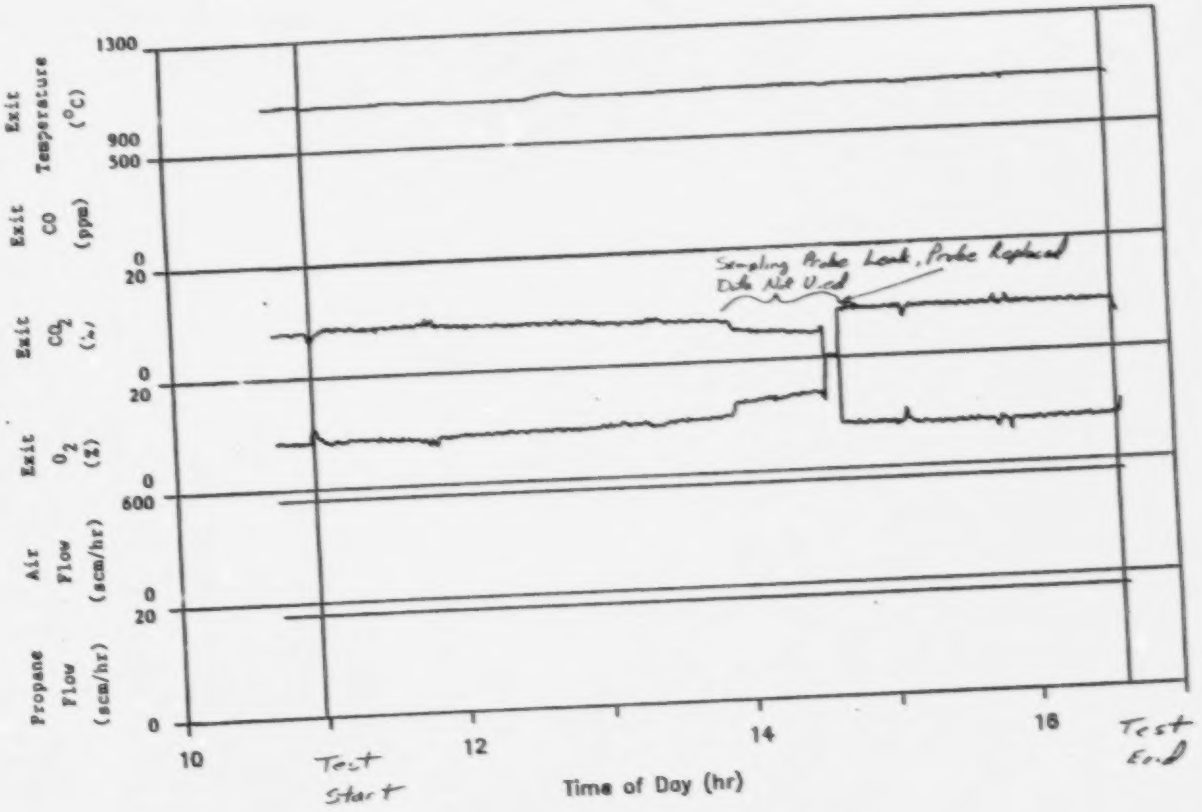

Figure A-10. Afterburner operation for Test 5 (8/25/88)

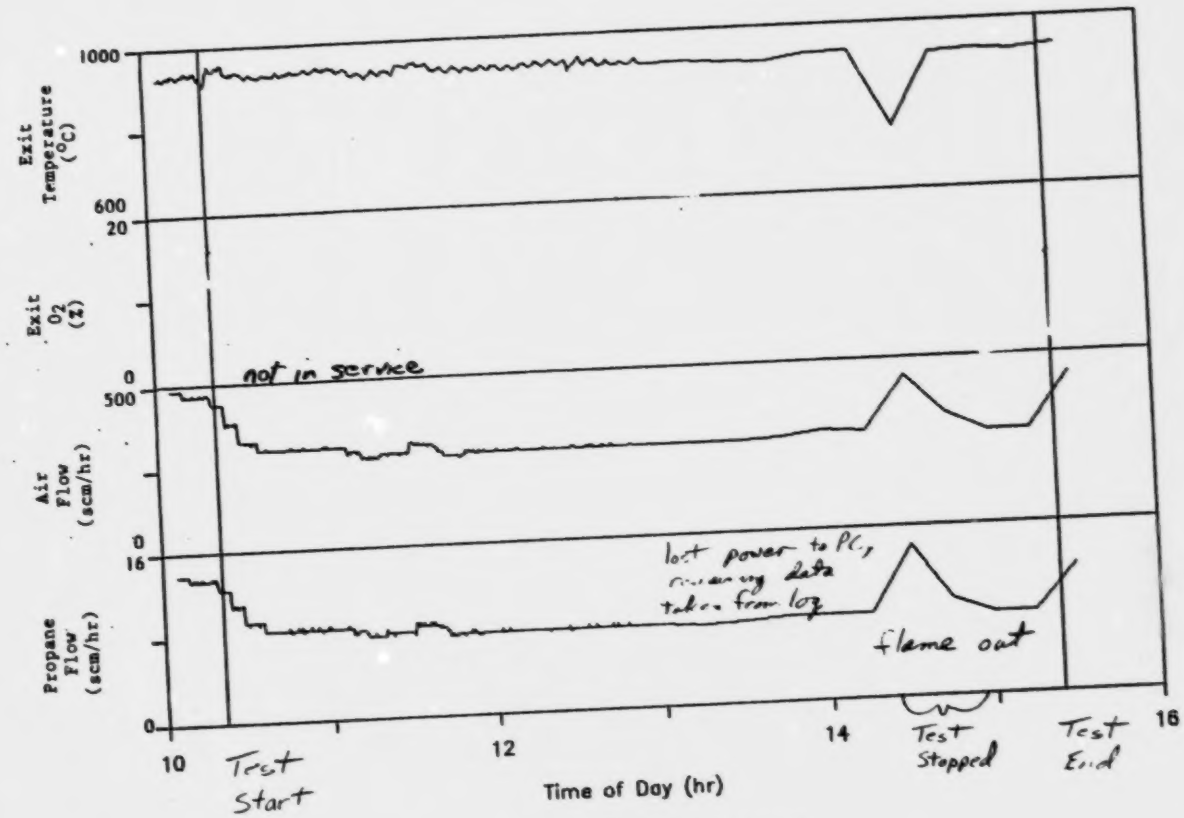

Figure A-11. Kiln operation for Test 6 (9/16/88)

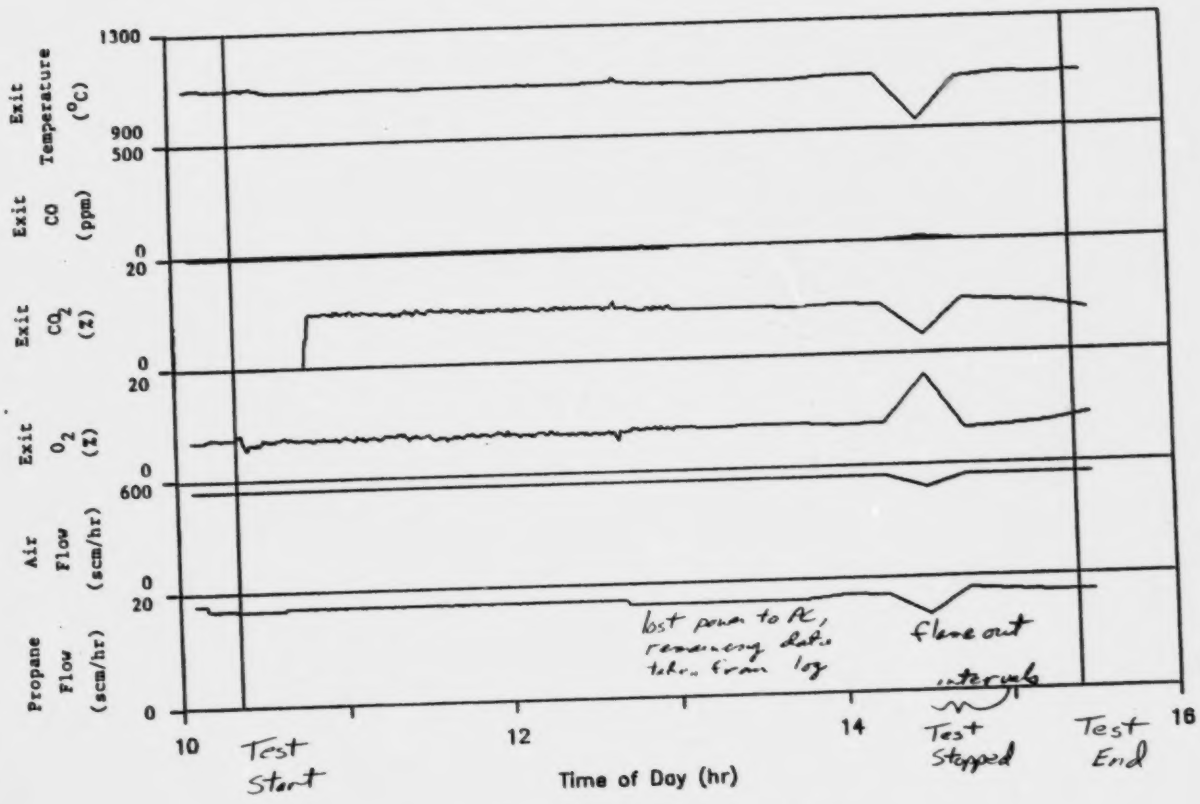

Figure A-12. Afterburner operation for Test 6 (9/16/88)

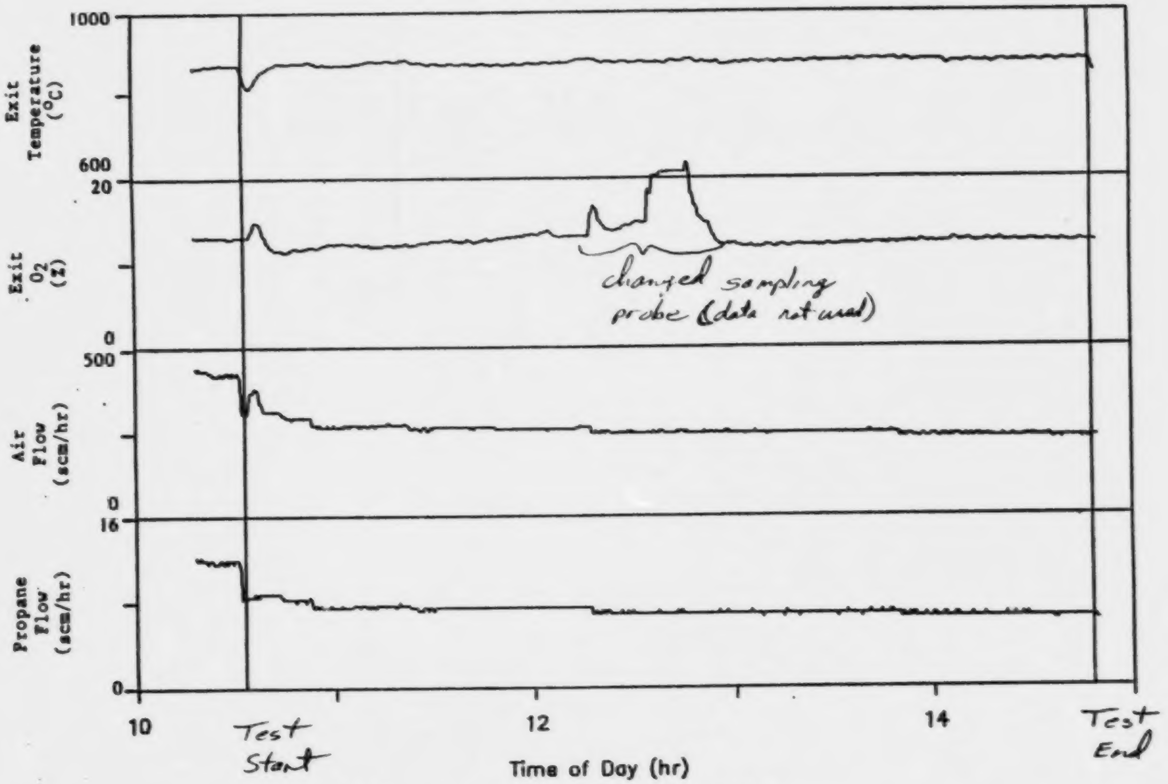

Figure A-13. Kiln operation for Test 7 (8/30/88)

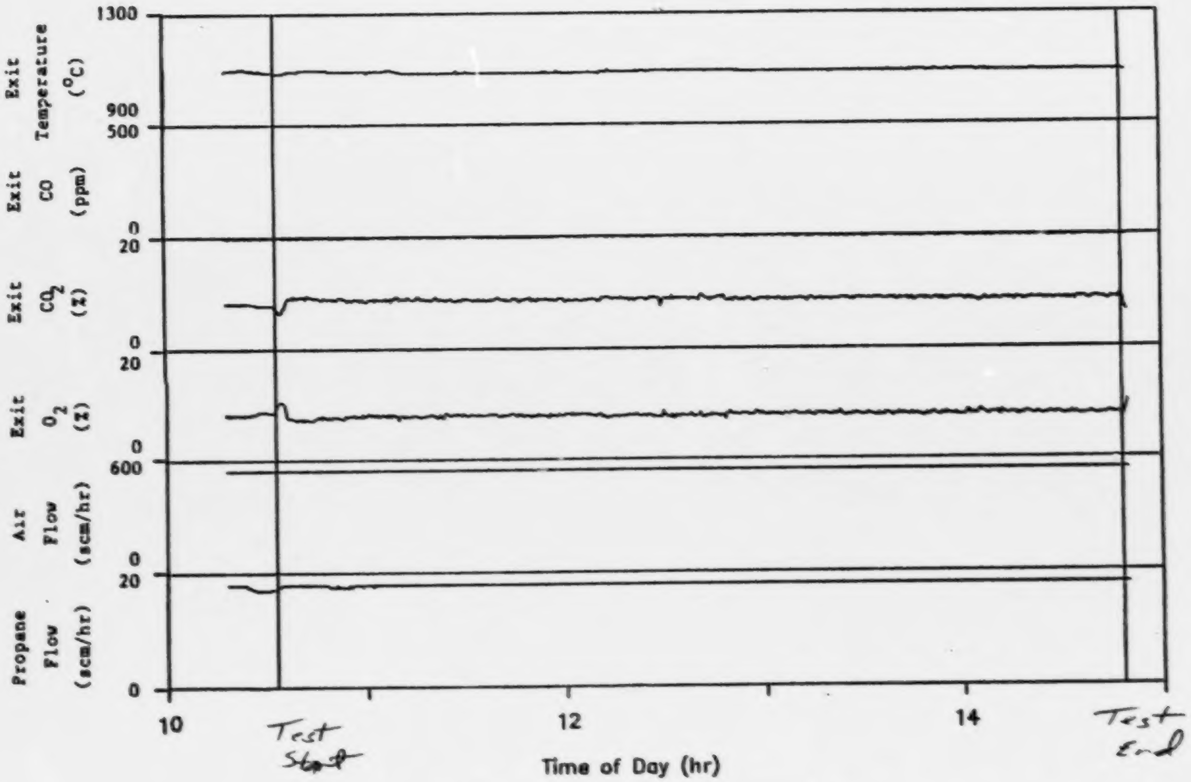

Figure A-14. Afterburner operation for Test 7 (8/30/88)

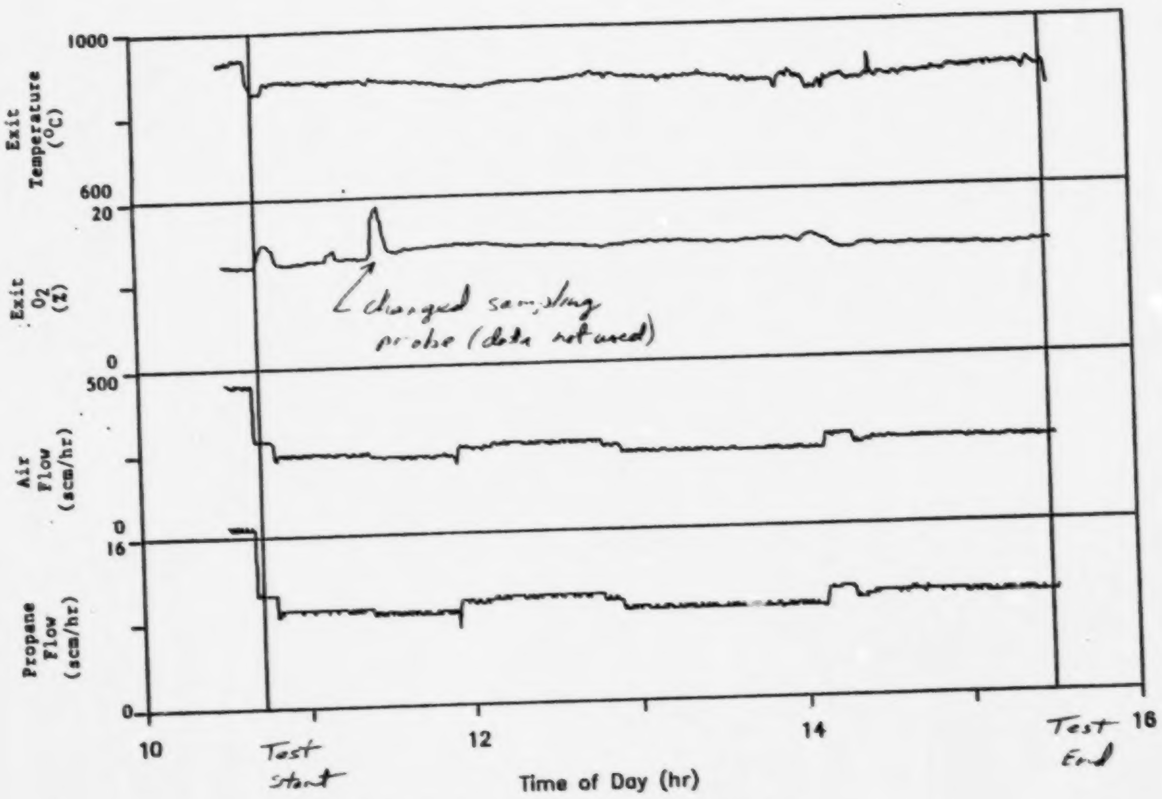

Figure A-15. Kiln operation for Test 8 (9/7/88)

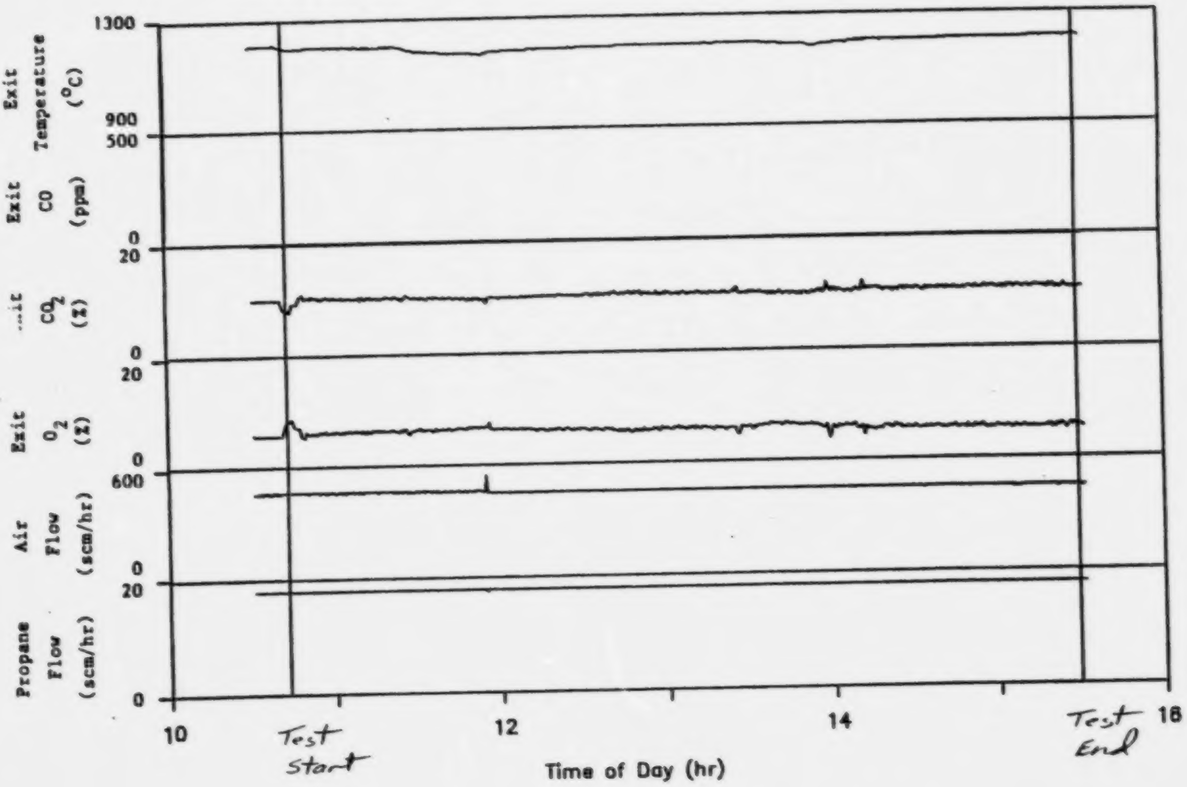

Figure A-16. Afterburner operation for Test 8 (9/7/88)

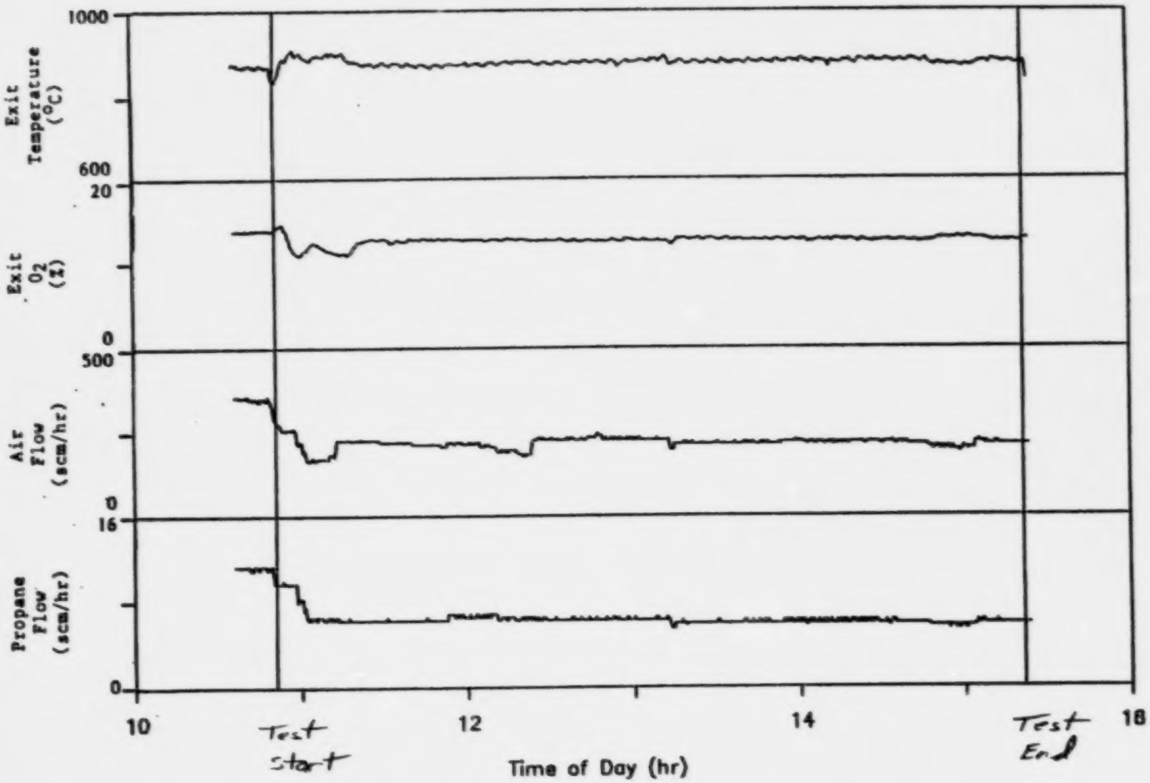

Figure A-17. Kiln operation for Test 9 (9/9/88)

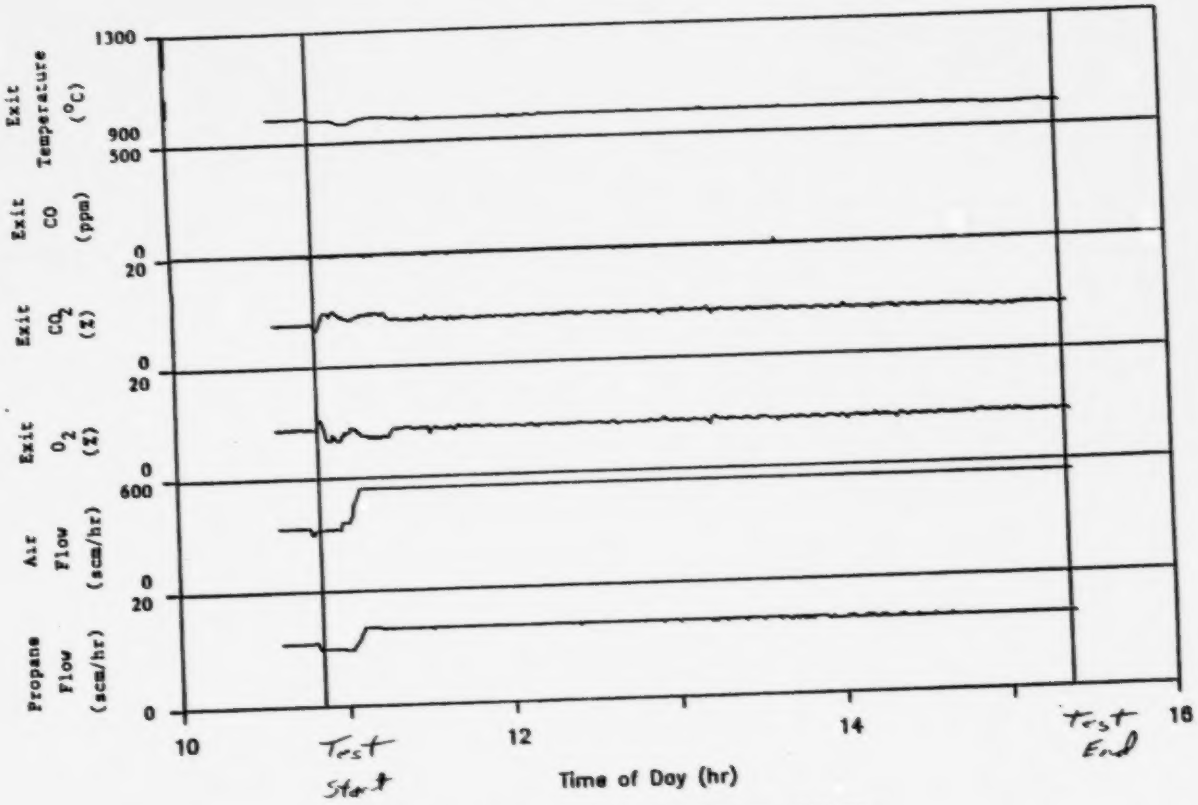

Figure A-18. Afterburner operation for Test 9 (9/9/88)

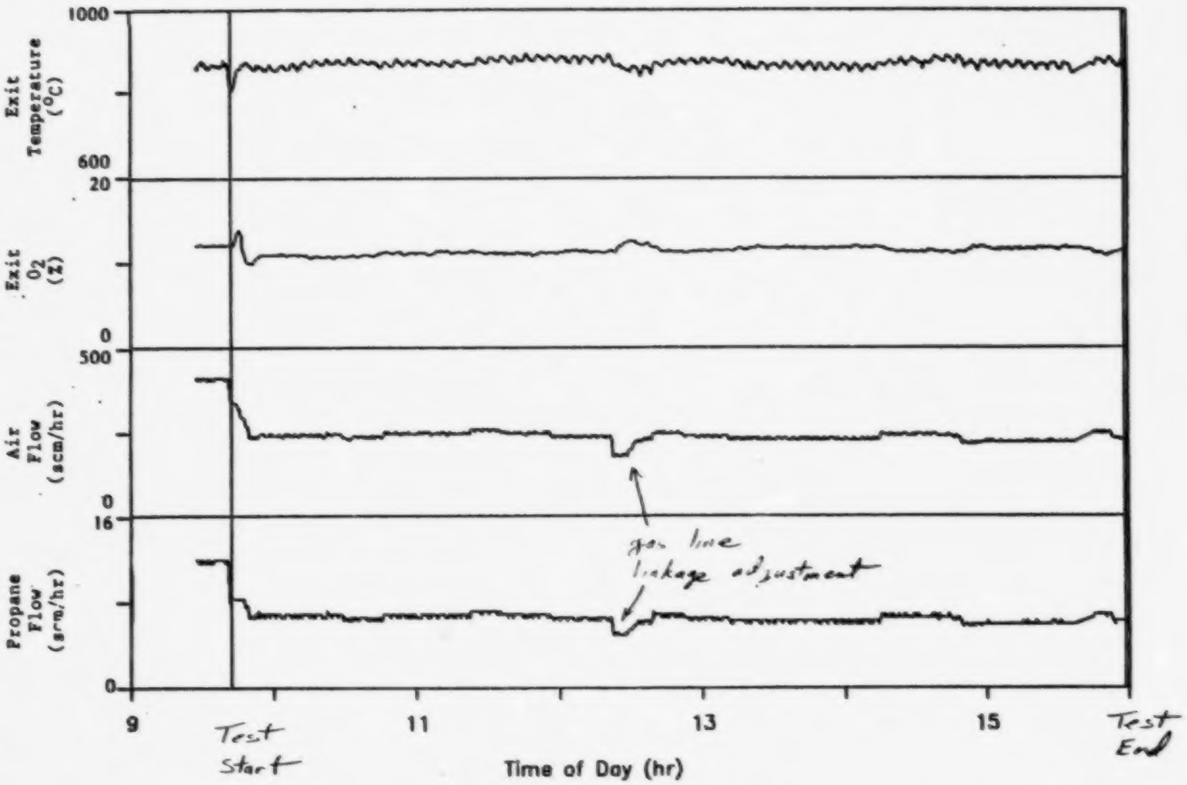

Figure A-19. Kiln operation for Test 10 (9/20/88)

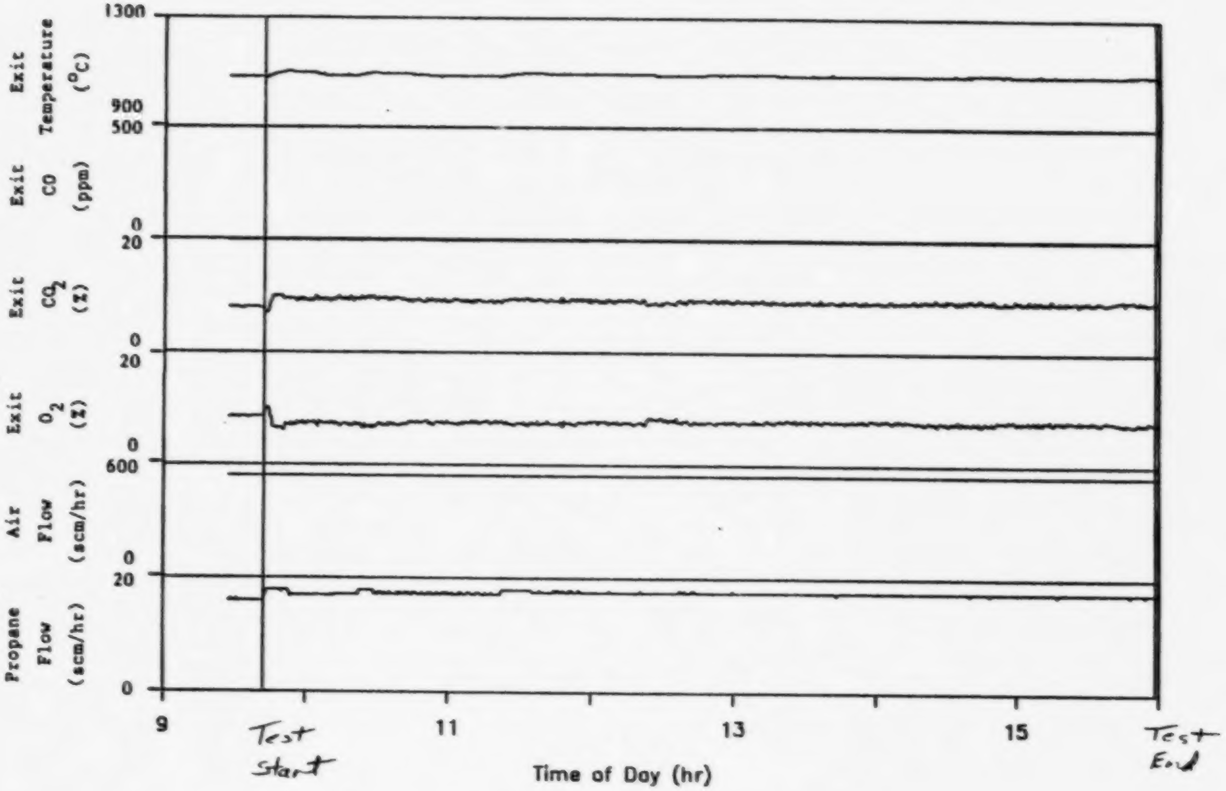

Figure A-20. Afterburner operation for Test 10 (9/20/88)

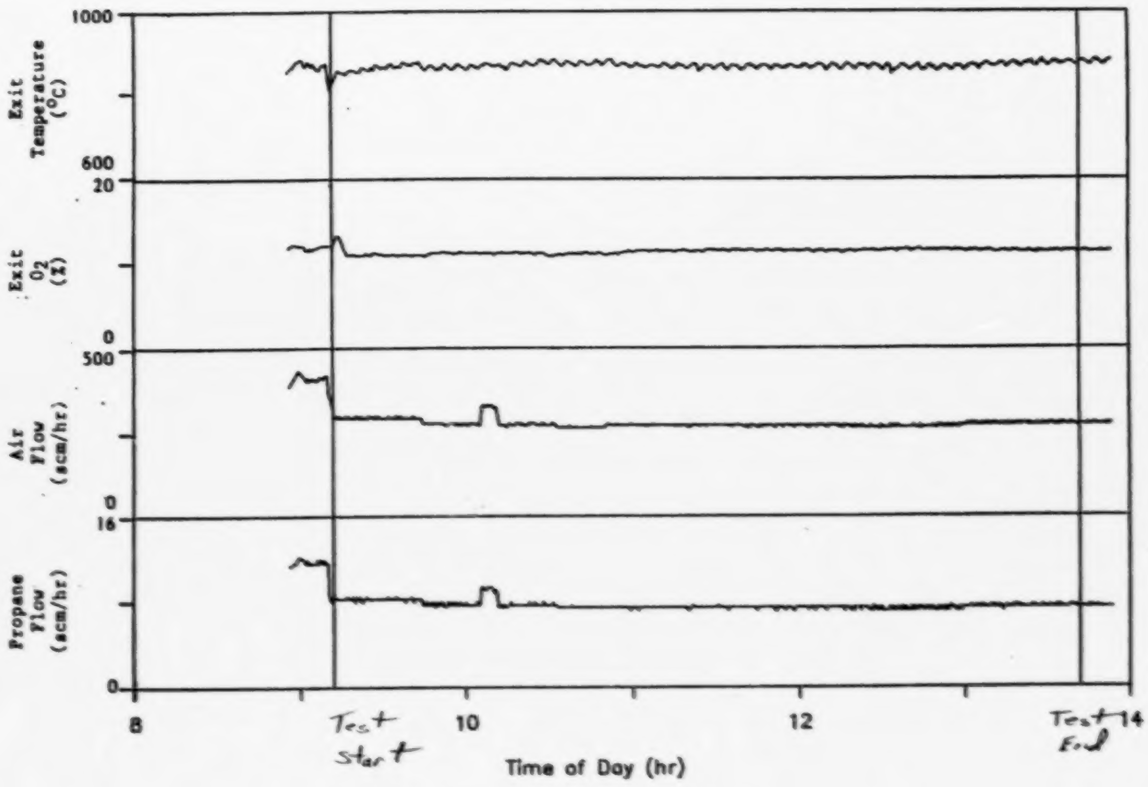

Figure A-21. Kiln operation for Test 11 (9/22/88)

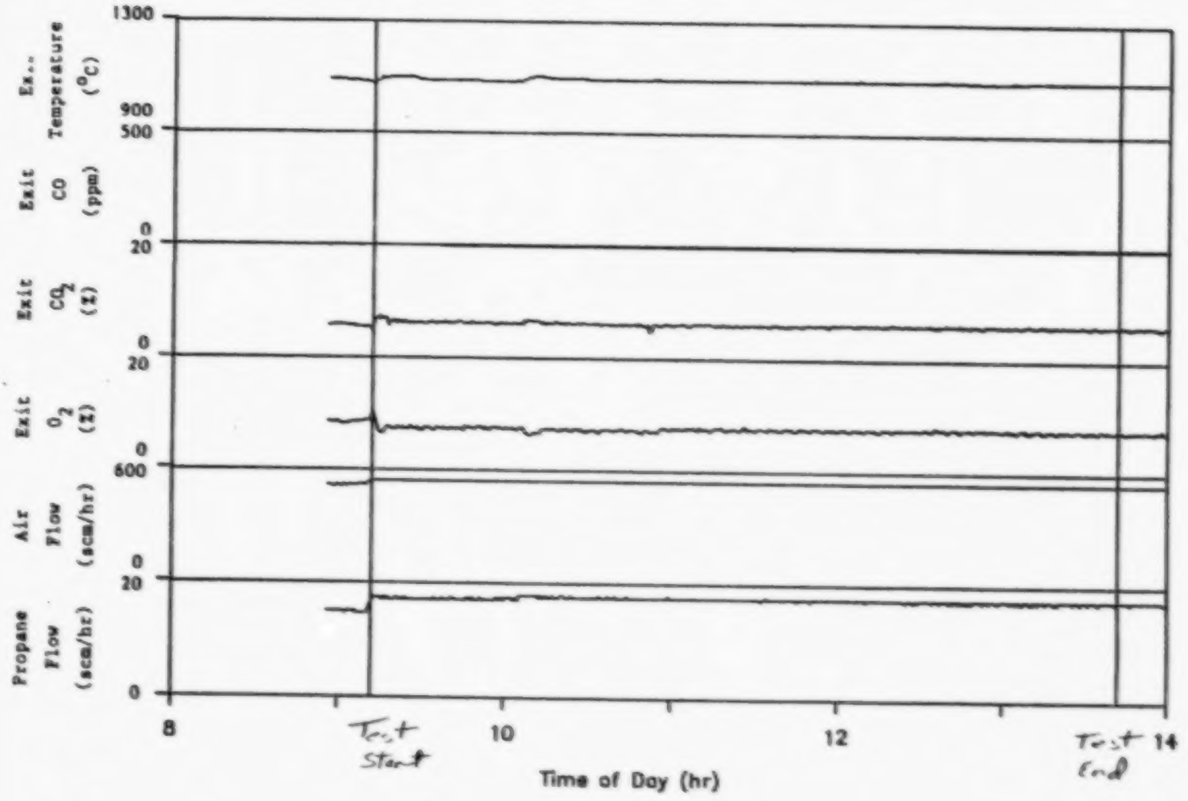

Figure A-22. Afterburner operation for Test 11 (9/22/88)

APPENDIX B

ANALYTICAL LABORATORY REPORTS

In the following reports, each sample has been assigned a sample ID number which consists of a letter prefix, eight numbers, and usually a one or more letter suffix. The prefix denotes the sampling location as follows:

- A: Sample taken in the afterburner exit flue gas
- B: Sample of the scrubber blowdown
- E: Sample taken in the scrubber exit flue gas
- F: Sample of the incinerator feed
- Q: QA/QC sample prepared in the laboratory
- S: Sample taken in the stack gas
- T: Sample of the kiln ash

The first four digits of the eight-digit number represent the month and day the sample was collected. The last four digits represent the 24-hour clock time the sample was collected. The suffix denotes the sample type as follows:

- F: Filter sample
- FBK: Field blank sample
- FSK: Field spike sample
- I1, I2, etc.: First impinger, second impinger, etc.
- M5: Method 5 train sample
- MSK: Matrix spike sample
- PW: Probe wash sample

- T1, T2: First sampling train, second sampling train
- V: VOST sample

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P.O. BOX 51610
KNOXVILLE, TN 37950-1610

2323 SYCAMORE DR.
KNOXVILLE, TN 37921-1750

Ms. Joan Bass
Acurex Corporation
Highway 65 North
NCTR Building 45
Jefferson, Arkansas 72079

November 28, 1988

Received: October 31st

Dear Ms. Bass:

Analysis of your compounds gave the following results:

Your #,	Our #,	% C,	% H,	% Cl,	% O,
F08300840	C-7425	8.43	1.87	2.85	9.38
F08300850	C-7426	13.94	2.17	3.26	9.96
F08300900	C-7427	17.70	2.43	3.17	9.40
F08311615	C-7428	12.99	1.96	3.05	9.04
F09090830	C-7429	13.87	2.09	3.37	8.41
F09130830	C-7430	14.91	2.18	0.31	10.12
F09130845	C-7431	16.67	2.45	< 0.01	9.18
F09130930	C-7432	16.96	2.49	0.03	8.16
F09160830	C-7433	14.94	2.14	3.07	9.51
F09160840	C-7434	14.59	2.22	3.09	8.63
F09160850	C-7435	12.02	1.81	2.90	9.65
F09200830	C-7436	11.08	1.83	2.94	9.71
F09200840	C-7437	15.52	2.22	2.17	9.23
F09200850	C-7438	13.93	2.03	2.88	10.39
F09211435	C-7439	9.88	1.78	5.83	8.98
F09211440	C-7440	14.08	1.82	5.83	8.91

LETTER AND SHIPMENTS BY U.S. MAIL · P.O. BOX 51610, KNOXVILLE, TN 37950-1610. OTHER CARRIERS · 2323 SYCAMORE DR. KNOXVILLE, TN 37921-1750
ESTABLISHED 1950

Ms. Joan Bass
Page 2
November 28, 1988

Your #,	Our #,	% C,	% H,	% Cl,	% O,
F09211445	C-7441	9.52	1.62	5.63	9.76
F09231410	C-7442	12.59	1.49	5.72	9.22
F09231420	C-7443	8.95	1.62	5.73	7.93
F09271515	C-7444	15.45	2.11	0.13	9.22
F09271520	C-7445	15.12	2.24	0.08	11.00
F09271525	C-7446	16.53	2.48	0.06	9.54
F08311600	C-7447	16.29	2.19	3.53	9.09

Sincerely yours,

GALBRAITH LABORATORIES, INC.

Gail R. Hutchens
Exec. Vice-President

GRH:sc

ACUREX Corporation

Environmental Systems Division

Acurex - CRF

November 9, 1988
Acurex ID: 8810006
Client PO: 8328
Page 1 of 5

Attention: Larry Waterland

Subject: Analysis of 5 VOST Traps and 1 VOST Condensate Sample, Received 9/22/88.

VOST traps were analyzed for purgeable organic compounds according to the standard VOST protocol (Method 5040 Test Methods for Evaluating Solid Waste EPA SW846 3rd. Ed., 1986). Results are presented in Table 1. The method can be summarized as follows:

> Traps are spiked with an internal standard and then desorbed for ten minutes at 180°C. The desorbed compounds are swept through a purging vessel containing 5 mL of water to retain any HCl and then onto an analytical trap for focusing. The analytical trap is heated and back flushed with helium to desorb the purgeables onto a chromatographic column. The gas chromatograph is temperature programmed to separate the purgeables which are then detected with a mass spectrometer.

The VOST condensate sample was analyzed for purgeable organic compounds according to U.S. EPA Method 8240 (Test Methods for Evaluating Solid Waste - SW846, 2nd Ed.,1982). Results are presented in Table 2. The method can be summarized as follows:

> Helium is bubbled through a 5-ml water sample in organic free water contained in a specially designed purging chamber. The purgeable volatile organic compounds are efficiently transferred from the aqueous phase to the vapor phase. The vapor is swept through a sorbent column where the purgeables are trapped. After purging is completed, the trap is heated and back flushed with helium to desorb the purgeables onto a gas chromatographic column. The gas chromatograph is temperature programmed to separate the purgeables that are then detected with a mass spectrometer.

Qualitative identification of the priority pollutants is performed initially using the relative retention times and the relative abundance of three unique ions. The entire mass spectrum is checked before any final identifications are recorded. Quantitative analysis is performed by the internal standard method using a single characteristic ion and response factors obtained from a daily calibration standard. In the tables, an entry such as "<5" means that the compound was not found at a level above the laboratory's reporting limit. The reporting limit, which is based on EPA reporting levels, has been corrected for any sample dilution.

Prior to analysis, every sample is spiked with surrogate compounds as part of Acurex's Quality Control Program. These compounds simulate the behavior of compounds of interest and confirm that acceptable recoveries are being achieved on every sample. The results of surrogate recoveries are reported with the sample results.

If you should have any technical questions, please contact Robert DeRosier at (415)961-5700.

Submitted by: Michael Flanagan
Michael Flanagan
Research Chemist

Approved by:
Robert DeRosier
Client Services Manager

Submitted by:
Shailesh Maingi
GC/MS Supervisor

Approved by: David R. Taylor
David R. Taylor, PhD.
Manager, Quality Assurance

These results were obtained by following standard laboratory procedures; the liability of Acurex Corporation shall not exceed the amount paid for this report. In no event shall Acurex be liable for special or consequential damages.

Table 1. VOST Results

Acurex-CRF Sample ID

8240 Compounds	Q0920 1329 VFSK ng/pair		E0920 1328 VT2 ng/pair	E0920 1054 VT2* ng/pair	Q0920 1056 VFBK ng/pair
Chloromethane	43		<10	66	<10
Bromomethane	<10		<10	<10	<10
Vinyl chloride	<10		<10	<10	<10
Chloroethane	<10		<10	<10	<10
Trichlorofluoromethane	660		42	49	390
1,1-Dichloroethene	400	(137%)	<5	<5	<5
Acetone	<5		17	<5	25
Carbon disulfide	<5		<5	<5	11
Methylene chloride	38		9	<5	37
trans-1,2-Dichloroethene	<5		<5	<5	<5
1,1-Dichloroethane	<5		<5	<5	<5
2-Butanone	<5		<5	<5	<5
Chloroform	<5		330	53	<5
1,1,1-Trichloroethane	200	(64%)	<5	<5	<5
Carbon tetrachloride	<5		15	<5	<5
Benzene	160	(65%)	15	<5	<5
1,2-Dichloroethane	<5		<5	<5	<5
Trichloroethene	<5		<5	<5	<5
1,2-Dichloropropane	<5		<5	<5	<5
Bromodichloromethane	<5		380	95	<5
trans-1,3-Dichloropropene	<5		<5	<5	<5
4-Methyl-2-pentanone	<5		<5	<5	<5
Toluene	170	(71%)	300	200	<5
cis-1,3-Dichloropropene	<5		<5	<5	<5
1,1,2-Trichloroethane	<5		<5	<5	<5
Tetrachloroethene	190	(84%)	55	31	<5
2-Hexanone	<5		<5	<5	<5
Dibromochloromethane	<5		260	140	<5
Chlorobenzene	130	(46%)	24	18	<5
Ethylbenzene	<5		<5	24	<5
m&p-Xylene	<5		<5	22	<5
o-Xylene	<5		<5	7	<5
Styrene	<5		<5	<5	<5
Bromoform	<5		230	300	<5
1,1,2,2-Tetrachloroethane	<5		<5	<5	<5
1,3-Dichlorobenzene	<5		<5	<5	<5
1,4-Dichlorobenzene	<5		<5	<5	<5
1,2-Dichlorobenzene	<5		<5	<5	<5
Date Sampled	9/20/88		9/20/88	9/20/88	9/20/88
Date Analyzed	10/6/88		10/6/88	10/6/88	10/6/88

Surrogates	Percent Recoveries (%)			
Toluene-d8	87	99	80	83
p-Bromofluorobenzene	57	65	79	37

* - Leak developed during analysis external standard quantitation

Table 1. VOST Results (Continued)

Acurex-CRF Sample ID

8240 Compounds	E0920 1430 VT2* ng/pair	Spike % Recov	Dup Spike % Recov	Method Blank ng/pair
Chloromethane	NQ	NS	NS	<10
Bromomethane	NQ	NS	NS	<10
Vinyl chloride	NQ	NS	NS	<10
Chloroethane	NQ	NS	NS	<10
Trichlorofluoromethane	NQ	NS	NS	<5
1,1-Dichloroethene	NQ	120	104	<5
Acetone	NQ	NS	NS	<5
Carbon disulfide	NQ	NS	NS	<5
Methylene chloride	NQ	NS	NS	<5
trans-1,2-Dichloroethene	NQ	NS	NS	<5
1,1-Dichloroethane	NQ	NS	NS	<5
2-Butanone	NQ	NS	NS	<5
Chloroform	NQ	NS	NS	<5
1,1,1-Trichloroethane	NQ	NS	NS	<5
Carbon tetrachloride	NQ	NS	NS	<5
Benzene	NQ	113	110	<5
1,2-Dichloroethane	NQ	NS	NS	<5
Trichloroethene	NQ	110	109	<5
1,2-Dichloropropane	NQ	NS	NS	<5
Bromodichloromethane	NQ	NS	NS	<5
trans-1,3-Dichloropropene	NQ	NS	NS	<5
4-Methyl-2-pentanone	NQ	NS	NS	<5
Toluene	NQ	118	97	<5
cis-1,3-Dichloropropene	NQ	NS	NS	<5
1,1,2-Trichloroethane	NQ	NS	NS	<5
Tetrachloroethene	NQ	131	120	<5
2-Hexanone	NQ	NS	NS	<5
Dibromochloromethane	NQ	NS	NS	<5
Chlorobenzene	NQ	113	100	<5
Ethylbenzene	NQ	NS	NS	<5
m&p-Xylene	NQ	NS	NS	<5
o-Xylene	NQ	NS	NS	<5
Styrene	NQ	NS	NS	<5
Bromoform	NQ	NS	NS	<5
1,1,2,2-Tetrachloroethane	NQ	NS	NS	<5
1,3-Dichlorobenzene	NQ	NS	NS	<5
1,4-Dichlorobenzene	NQ	NS	NS	<5
1,2-Dichlorobenzene	NQ	NS	NS	<5
Date Sampled	9/20/88	NA	NA	NA
Date Analyzed	10/6/88	10/6/88	10/6/88	10/6/88

Surrogates		Percent Recoveries (%)		
Toluene-d8	NQ	102	92	107
p-Bromofluorobenzene	NQ	93	75	94

* - Leak developed during analysis NQ - Not quantifiable NS - Not spiked

Table 2. Volatile Organic Results

Acurex-CRF Sample ID

8240 Compounds	E0920 1510VT2 ug/L	Method Blank ug/L	Storage Blank ug/L	Spike % Recov	Dup Spike % Recov
Chloromethane	<10	<10	<10	NS	NS
Bromomethane	<10	<10	<10	NS	NS
Vinyl chloride	<10	<10	<10	NS	NS
Chloroethane	<10	<10	<10	NS	NS
Methylene chloride	27	<5	<5	NS	NS
Trichlorofluoromethane	<5	<5	<5	NS	NS
1,1-Dichloroethene	<5	<5	<5	150	150
1,1-Dichloroethane	<5	<5	<5	NS	NS
trans-1,2-Dichloroethene	<5	<5	<5	NS	NS
Chloroform	<5	<5	<5	NS	NS
1,2-Dichloroethane	<5	<5	<5	NS	NS
1,1,1-Trichloroethane	<5	<5	<5	NS	NS
Carbon tetrachloride	<5	<5	<5	NS	NS
Bromodichloromethane	<5	<5	<5	NS	NS
1,2-Dichloropropane	<5	<5	<5	NS	NS
trans-1,3-Dichloropropene	<5	<5	<5	NS	NS
Trichloroethene	<5	<5	<5	120	120
Benzene	<5	<5	<5	130	130
Dibromochloromethane	<5	<5	<5	NS	NS
1,1,2-Trichloroethane	<5	<5	<5	NS	NS
cis-1,3-Dichloropropene	<5	<5	<5	NS	NS
2-Chloroethylvinylether	<10	<10	<10	NS	NS
Bromoform	<5	<5	<5	NS	NS
1,1,2,2-Tetrachloroethane	<5	<5	<5	NS	NS
Tetrachloroethene	<5	<5	<5	NS	NS
Toluene	6	<5	<5	130	130
Chlorobenzene	<5	<5	<5	120	120
Ethylbenzene	<5	<5	<5	NS	NS
Dichlorobenzenes	<5	<5	<5	NS	NS
Date Analyzed	10/6/88	10/6/88	10/6/88	10/6/88	10/6/88

Surrogates	Percent Recoveries (%)				
1,2-Dichloroethane-d4	123	90	88	105	110
Toluene-d8	114	101	101	97	98
p-Bromofluorobenzene	102	94	99	94	97

NS - Not spiked

ACUREX Corporation

Environmental Systems Division

Acurex - CRF

November 2, 1988
Acurex ID: 8810013
Client PO: 8327
Page 1 of 8
Rev. 12/21/88

Attention: Larry Waterland

Subject: Analysis of 23 Samples, Received 9/27/88.

Water samples were analyzed for requested metals using inductively coupled argon plasma spectroscopy or atomic absorption spectroscopy following Methods for Chemical Analysis of Water and Wastes. The EPA method employed is listed alongside of the parameter. Samples were digested according to EPA protocol prior to analysis. The results are presented in Table 1.

Soil samples were analyzed for requested metals using inductively coupled argon plasma spectroscopy or atomic absorption spectroscopy following Test Methods for Evaluating Solid Waste. The EPA method employed is listed alongside of the parameter. Samples were prepared using EPA method 3050 by digesting the sample in acid prior to analysis. The results are presented in Table 2. Sample T0920 1558 was rerun for barium and the data confirmed (see page 7).

Samples B08251354, T08301450, and T09161625 could not be analyzed because the bottles were broken in transit.

If you should have any technical questions, please contact Robert DeRosier at (415)961-5700.

Submitted by: ______________________
Maryann Gambino
Supervisor, Inorganic Chemistry

Approved by: ______________________
Robert DeRosier
Client Services Manage

Approved by: David R. Taylor
David R. Taylor, Ph.D.
Quality Assurance Manager

These results were obtained by following standard laboratory procedures; the liability of Acurex Corporation shall not exceed the amount paid for this report. In no event shall Acurex be liable for special or consequential damages.

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Table 1. Metals Results

		Acurex-CRF Sample ID				
		E0825 1211M5 I1 & I2	E0825 1211M5 I3	E0825 1211M5 I4	E0825 1211M5 PW	A0825 1200 I1 & I2
Parameter	EPA Method	mg/L	mg/L	mg/L	mg/L	mg/L
Arsenic	206.2	<0.01	<0.01	<0.01	<0.05	0.062
Barium	200.7	0.023	0.046	0.04	<0.05	0.59
Bismuth		<0.1	0.29	0.39	1.3	2.2
Cadmium	200.7	<0.01	<0.01	0.088	<0.05	1.1
Chromium	200.7	0.011	0.011	0.13	0.85	98
Copper	200.7	0.029	0.038	0.14	0.42	9.1
Lead	200.7	<0.01	<0.01	0.55	0.02	1.2
Magnesium	200.7	0.11	0.21	0.91	<0.25	2.0
Strontium		0.02	0.04	0.11	0.1	0.2

Sample volume (mL):	1310	150	265	39	1240
Volume used (mL):	100	100	100	20	100
Dilution factor:	1	1	1	5	1
Chloride aliquot* (mL):	100	--	--	--	100

Note: Dilution factors are already incorporated in data above.

* - Aliquot taken at CRF, not included in above sample volume.

Table 1. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	A0825 1200 I3 mg/L	A0825 1200 I4 mg/L	A0825 1200 PW mg/L	B0825 1154 mg/L	B0825 1254 mg/L
Arsenic	206.2	<0.01	<0.02	0.19	0.036	0.065
Barium	200.7	0.29	0.61	<0.02	1.2	0.87
Bismuth		<0.1	0.28	2.1	1.1	3.3
Cadmium	200.7	0.031	0.32	1.1	0.14	0.28
Chromium	200.7	0.091	0.36	0.87	0.094	0.2
Copper	200.7	0.19	0.82	8.2	1.2	1.8
Lead	200.7	0.036	2.2	2.6	0.68	1.4
Magnesium	200.7	0.71	2.4	3.0	20	23
Strontium		0.1	0.28	<0.02	2.4	1.9
Sample volume (mL):		295	92	116	250	265
Volume used (mL):		100	50	50	100	100
Dilution factor:		1	2	2	1	1

Note: Dilution factors are already incorporated in data above.

Table 1. Metals Results

		Acurex-CRF Sample ID				
					E0825 1211M5 I1 & I2 Spike	E0825 1211M5 I1 & I2 Dup Spike
		B0825 1454	B0825 1554	B0825 1630		
Parameter	EPA Method	mg/L	mg/L	mg/L	% Recov	RPD
Arsenic	206.2	0.058	0.15	0.13	86	5.9
Barium	200.7	0.97	0.87	0.83	97	0.56
Bismuth		4.7	3.1	2.1	88	17
Cadmium	200.7	0.52	0.33	0.27	101	0.3
Chromium	200.7	0.42	0.39	0.29	97	0.24
Copper	200.7	4.8	2.4	2.2	92	0.47
Lead	200.7	2.7	1.9	1.4	104	1.9
Magnesium	200.7	26	23	20	91	0.52
Strontium		1.9	1.8	1.7	101	0
Sample volume (mL):		255	260	260	1310	1310
Volume used (mL):		100	100	100	100	100
Dilution factor:		1	1	1	1	1

Note: Dilution factors are already incorporated in data above.

Table 1. Metals Results

Parameter	EPA Method	Acurex-CRF Sample ID	
		Method Blank mg/L	Method Detection Limit mg/L
Arsenic	206.2	<0.01	0.01
Barium	200.7	<0.01	0.01
Bismuth		0.36	0.1
Cadmium	200.7	<0.01	0.01
Chromium	200.7	<0.01	0.01
Copper	200.7	<0.01	0.01
Lead	200.7	0.0017	0.001
Magnesium	200.7	<0.05	0.05
Strontium		<0.01	0.01

Sample volume (mL):	100
Volume used (mL):	100
Dilution factor:	1

Note: Dilution factors are already incorporated in data above.

Table 2. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	E0825 1211 MSF mg/filt	Q0926 1240 TBK mg/filt	T0825 1636 mg/kg	T0907 1530 mg/kg	T0909 1520 mg/kg
Arsenic	7060	0.053	<0.001	27	18	21
Barium	6010	0.057	0.016	24	68	43
Bismuth		2.4	0.038	20	25	13
Cadmium	6010	0.2	<0.001	<1	<1	<1
Chromium	6010	0.16	0.008	93	55	82
Copper	6010	3.0	0.007	240	180	210
Lead	6010	1.5	0.0022	4.9	5.0	2.0
Magnesium	6010	5.9	0.58	39000	20000	27000
Strontium		0.025	0.15	74	75	160

Table 2. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	TO914 1500	TO920 1558	TO922 1539	TO825 1636 Spike	TO825 1636 Dup Spike
		mg/kg	mg/kg	mg/kg	% Recov	RPD
Arsenic	7060	27	21	29	125	6.5
Barium	6010	24	360	36	106	1.3
Bismuth		41	21	51	136	13
Cadmium	6010	<1	<1	<1	86	1.7
Chromium	6010	75	66	75	93	5
Copper	6010	200	200	190	137	5.7
Lead	6010	3.7	3.0	3.4	111	18
Magnesium	6010	27000	22000	25000	81	5.1
Strontium		82	120	120	129	7.6

Table 2. Metals Results

		Acurex-CRF Sample ID	
Parameter	EPA Method	Method Blank mg/L	Method Detection Limit mg/kg
Arsenic	7060	<0.01	1
Barium	6010	<0.01	1
Bismuth		<0.1	10
Cadmium	6010	<0.01	1
Chromium	6010	<0.01	1
Copper	6010	0.018	1
Lead	6010	0.0018	0.1
Magnesium	6010	<0.05	5
Strontium		<0.01	1

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Environmental Systems Division

Acurex - CRF

November 2, 1988
Acurex ID: 8810014
Client PO: 8327
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Rev. 12/21/88

Attention: Larry Waterland

Subject: Analysis of 15 Water Samples, Received 9/29/88.

Water samples were analyzed for requested metals using inductively coupled argon plasma spectroscopy or atomic absorption spectroscopy following methods for chemical analysis of water and wastes. The EPA method employed is listed alongside of the parameter. Samples were digested according to EPA protocol prior to analysis. The results are presented in Table 1.

If you should have any technical questions, please contact Robert DeRosier at (415)961-5700.

Submitted by:
Maryann Gambino
Supervisor, Inorganic Chemistry

Approved by:
Robert DeRosier
Client Services Manager

Approved by: David R. Taylor
David R. Taylor, Ph.D.
Quality Assurance Manager

These results were obtained by following standard laboratory procedures; the liability of Acurex Corporation shall not exceed the amount paid for this report. In no event shall Acurex be liable for special or consequential damages.

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Table 1. Metals Results

		Acurex - CRF Sample ID				
		BO830 1114	BO830 1214	BO830 1314	BO830 1414	BO830 1444
Parameter	EPA Method	mg/L	mg/L	mg/L	mg/L	mg/L
Arsenic	206.2	1.7	0.076	0.2	0.22	0.14
Barium	200.7	0.34	0.97	1.1	1.3	1.2
Bismuth		2.6	3.2	5.5	3.5	3.4
Cadmium	200.7	2.8	0.23	0.38	0.32	0.47
Chromium	200.7	3.0	0.24	0.46	0.36	0.44
Copper	200.7	21	2.3	3.7	2.6	2.9
Lead	200.7	4.1	1.7	2.5	1.5	1.7
Magnesium	200.7	95	18	24	20	22
Strontium		1.5	1.2	1.2	1.2	1.2
Sample volume (mL):		126	190	222	244	225
Volume used (mL):		100	100	100	100	100
Dilution factor:		1	1	1	1	1

Note: Dilution factors are already incorporated in data above.

Table 1. Metals Results

Acurex - CRF Sample ID

Parameter	EPA Method	E0830 1117M5 I1 & I2 mg/L	E0830 1117M5 I3 mg/L	E0830 1117M5 I4 mg/L	E0830 1117M5 PW mg/L	A0830 1114 I1 & I2 mg/L
Arsenic	206.2	<0.01	<0.01	<0.02	<0.05	0.039
Barium	200.7	0.02	0.041	0.062	<0.05	4.4
Bismuth		0.22	0.3	0.42	<0.5	2.0
Cadmium	200.7	<0.01	<0.01	<0.02	0.073	0.51
Chromium	200.7	<0.01	<0.01	<0.02	<0.05	410
Copper	200.7	0.029	0.06	0.14	1.7	6.2
Lead	200.7	<0.01	<0.01	0.0039	0.016	2.1
Magnesium	200.7	0.066	0.23	0.5	<0.25	7.4
Strontium		<0.01	0.04	0.08	<0.05	0.25
Sample volume (mL):		1380	420	115	68	1125
Volume used (mL):		100	100	50	20	100
Dilution factor:		1	1	2	5	1
Chloride aliquot* (mL):		100	--	--	--	100

Note: Dilution factors are already incorporated in data above.

* - Taken at CRF, not included in sample volume listed above.

Table 1. Metals Results

		Acurex - CRF Sample ID				
Parameter	EPA Method	A0830 1114 I3	A0830 1114 I4	A0830 1114 PW	E0830 1117,5 I1 & I2 Spike	E0830 1117,5 I1 & I2 Dup Spike
		mg/L	mg/L	mg/L	% Recov	RPD
Arsenic	206.2	0.013	<0.01	0.023	95	3.3
Barium	200.7	1.5	0.16	0.66	101	3.6
Bismuth		0.96	0.59	0.59	93	14
Cadmium	200.7	0.083	0.042	0.047	106	2.8
Chromium	200.7	0.23	0.044	0.081	102	2.8
Copper	200.7	0.54	0.31	0.82	96	3.6
Lead	200.7	0.22	0.062	0.41	104	11
Magnesium	200.7	0.57	0.36	7.8	95	4.5
Strontium		0.05	0.04	0.83	105	2.9
Sample volume (mL):		670	680	205	1380	1380
Volume used (mL):		100	100	100	100	100
Dilution factor:		1	1	1	1	1

Note: Dilution factors are already incorporated in data above.

Table 1. Metals Results

Acurex - CRF Sample ID

Parameter	EPA Method	Method Blank mg/L	Method Detection Limit mg/L
Arsenic	206.2	<0.01	0.01
Barium	200.7	<0.01	0.01
Bismuth		0.14	0.1
Cadmium	200.7	<0.01	0.01
Chromium	200.7	<0.01	0.01
Copper	200.7	0.013	0.01
Lead	200.7	<0.001	0.001
Magnesium	200.7	<0.05	0.05
Strontium		<0.01	0.01

Sample volume (mL): 100

Volume used (mL): 100

Dilution factor: 1

Note: Dilution factors are already incorporated in data above.

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Environmental Systems Division

Acurex - CRF

October 21, 1988
Acurex ID: 8810015
Client PO: 8327
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Rev. 12/21/88

Attention: Larry Waterland

Subject: Analysis of 12 Water Samples, Received 9/27/88.

Water samples were analyzed for requested metals using inductively coupled Argon Plasma Spectroscopy or atomic absorption spectrometry following methods for chemical analysis of water and wastes. The EPA method employed is listed alongside of the parameter. Samples were digested according to EPA protocol prior to analysis. The results are presented in Table 1.

If you should have any technical questions, please contact Robert DeRosier at (415)961-5700.

Submitted by: Maryann Gambino
Supervisor, Inorganic Chemistry

Approved by: Robert DeRosier
Client Services Manager

Approved by: David R. Taylor
David R. Taylor, PhD.
Quality Assurance Manager

These results were obtained by following standard laboratory procedures; the liability of Acurex Corporation shall not exceed the amount paid for this report. In no event shall Acurex be liable for special or consequential damages.

Table 1. Metals Results

		Acurex-CRF Sample ID				
		B0926 1040 (SBD6)	B0926 1140 (SBD6)	B0926 1240 (SBD6)	B0926 1331 (SBD6)	E0926 1055 (RKS PORT)
Parameter	EPA Method	mg/L	mg/L	mg/L	mg/L	mg/L
Chromium (hex.)		0.13	0.099	0.31	0.4	2.6
Sample volume, Total (mL):		140	144	152	150	154
Sample volume, Used (mL):		100	100	100	100	100
Sample weight, Ash (mg):		--	--	--	--	--
Sample volume, Chloride* (mL):		--	--	--	--	--

* - Aliquot taken at CRF, not included in total volume.

Table 1. Metals Results

		Acurex-CRF Sample ID				
		E0926 1047 M5T2I-1	E0926 1047 M5T2I-2	E0926 1047 M5T2I-3	A0926 1039 M5T2I-1	A0926 1039 M5T2I-2
Parameter	EPA Method	mg/L	mg/L	mg/L	mg/L	mg/L
Chromium (hex.)		0.061	0.044	0.015	0.01	<0.003
Sample volume, Total (mL):		1045	315	182	292	158
Sample volume, Used (mL):		100	100	100	100	100
Sample weight, Ash (mg):		--	--	--	--	--
Sample volume, Chloride* (mL):		50	50	--	50	50

* - Aliquot taken at CRF, not included in total volume.

Table 1. Metals Results

		Acurex-CRF Sample ID				
		A0926 1039 M5T2I-3	T0926 1345 RV284	Spike	Dup Spike	Method Blank
Parameter	EPA Method	mg/L	mg/L	% Recov	RPD	mg/L
Chromium (hex.)		<0.006	0.012	102	0	<0.003
Sample volume, Total (mL):		87	400	1045	1045	100
Sample volume, Used (mL):		50	100	100	100	100
Sample weight, Ash (mg):		--	100	--	--	--
Sample volume, Chloride* (mL):		--	--	--	--	--

* - Aliquot taken at CRF, not included in total volume.

Table 1. Metals Results

		Acurex-CRF Sample ID
Parameter	EPA Method	Method Detection Limit mg/L
Chromium (hex.)		0.003

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Environmental Systems Division

Acurex CRF
NCTR Bld. 45
Jefferson, AR

October 18, 1988
Acurex ID: 8810016
Client PO: 8327
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Rev. 12/21/88

Attention: Larry Waterland

Subject: Analysis of 14 Water Samples, Received 9/30/88.

Water samples were analyzed for requested metals using inductively coupled Argon Plasma Spectroscopy or atomic absorption spectrometry following methods for chemical analysis of water and wastes. The EPA method employed is listed alongside of the parameter. Samples were digested according to EPA protocol prior to analysis. The results are presented in Table 1.

If you should have any technical questions, please contact Robert DeRosier at (415)961-5700.

Submitted by: Maryann Gambino
Supervisor, Inorganic Chemistry

Approved by: Robert DeRosier
Client Services Manager

Approved by: David R. Taylor
David R. Taylor, PhD
Quality Assurance Manager

These results were obtained by following standard laboratory procedures; the liability of Acurex Corporation shall not exceed the amount paid for this report. In no event shall Acurex be liable for special or consequential damages.

485 Clyde Avenue, PO Box 7044, Mountain View, CA 94039 (415) 961-5700 Telex 325961 FAX (415) 964-5145

Table 1. Metals Results

		ACUREX CRF Sample ID				
		B0928 0932	B0928 1032	B0928 1132	B0928 1229	F0928 0950
Parameter	EPA Method	mg/L	mg/L	mg/L	mg/L	mg/L
Chromium (hex.)	218.4	0.032	0.09	0.072	0.067	0.93
Sample volume, Total (mL):		136	134	150	140	136
Sample volume, Used (mL):		100	100	100	100	100
Sample weight, Ash (mg):		--	--	--	--	--
Aliquot taken for Chloride analysis* (mL):		--	--	--	--	--

* - Taken at CRF, before shipment of sample.

Table 1. Metals Results

Parameter	EPA Method	ACUREX CRF Sample ID				
		E0928 0940M5 (I-1,T2)	E0928 0940M5 (I-2,T2)	E0928 0940M5 (I-3,T2)	A0928 0931M5 (I-1,T2)	A0928 0931M5 (I-2,T2)
		mg/L	mg/L	mg/L	mg/L	mg/L
Chromium (hex.)	218.4	0.006	0.032	0.007	0.46	<0.003
Sample volume, Total (mL):		1140	305	165	400	156
Sample volume, Used (mL):		100	100	100	100	100
Sample weight, Ash (mg):		--	--	--	--	--
Aliquot taken for Chloride analysis* (mL):		50	50	--	50	50

* - Taken at CRF, before shipment of sample.

Table 1. Metals Results

		ACUREX CRF Sample ID				
		A0928 0931M5 (I-3,T2)	T0928 1231	Q0929 0830FSK	Q0929 0831FSK	E0928 0940M5 (I-1,T2) Spike
Parameter	EPA Method	mg/L	mg/L	mg/L	mg/L	% Recov
Chromium (hex.)	218.4	0.029	0.063	0.97	1.6	94
Sample volume, Total (mL):		132	400	400	400	1140
Sample volume, Used (mL):		100	100	100	100	100
Sample weight, Ash (mg):		--	100.0	100.04	100.07	--
Aliquot taken for Chloride analysis* (mL):		--	--	--	--	--

* - Taken at CRF, before shipment of sample.

Table 1. Metals Results

ACUREX CRF Sample ID

Parameter	EPA Method	DUP SPIKE RPD	METHOD BLANK mg/L	Method Detection Limit mg/L
Chromium (hex.)	218.4	6.2	<0.003	0.003
Sample volume, Total (mL):		1140	100	
Sample volume, Used (mL):		100	100	
Sample weight, Ash (mg):		--	--	
Aliquot taken for Chloride analysis* (mL):		--	--	

* - Taken at CRF, before shipment of sample.

ACUREX
Corporation

Environmental Systems Division

Acurex - CRF

October 13, 1988
Acurex ID: 8810017
Client PO: 8327
Page 1 of 5
Rev. 12/20/88

Attention: Larry Waterland

Subject: Analysis of 14 Samples, Received 9/30/88.

Water samples were analyzed for requested metals using inductively coupled Argon Plasma Spectroscopy or atomic absorption spectrometry following methods for chemical analysis of water and wastes. The EPA method employed is listed alongside of the parameter. Samples were digested according to EPA protocol prior to analysis. The results are presented in Table 1.

If you should have any technical questions, please contact Robert DeRosier at (415)961-5700.

Submitted by: ______________________
Maryann Gambino
Supervisor, Inorganic Chemistry

Approved by: ______________________
Robert DeRosier
Client Services Manager

Approved by: David R. Taylor
David R. Taylor, PhD.
Quality Assurance Manager

These results were obtained by following standard laboratory procedures; the liability of Acurex Corporation shall not exceed the amount paid for this report. In no event shall Acurex be liable for special or consequential damages.

Table 1. Metals Results

		Acurex - CRF Sample ID				
		B0929 0908	B0929 1008	B0929 1108	B0929 1159	Q0929 1030 BSK
Parameter	EPA Method	mg/L	mg/L	mg/L	mg/L	mg/L
Chromium (hex.)	218.4	0.028	0.1	0.28	0.23	0.19
Sample volume, Total (mL):		151	151	150	144	50
Sample volume, Used (mL):		100	100	100	100	25
Sample Weight, Ash (g):		---	---	---	---	---

Table 1. Metals Results

		Acurex - CRF Sample ID				
		F0929 0908	T0929 1200	E0929 0920 M5I-1	E0929 0920 M5I-2	E0929 0920 M5I-3
Parameter	EPA Method	mg/L	mg/L	mg/L	mg/L	mg/L
Chromium (hex.)	218.4	2700	0.067	<0.003	0.014	<0.003
Sample volume, Total (mL):		115	400	1460	385	174
Sample volume, Used (mL):		100	100	100	100	100
Sample Weight, Ash (g):		---	100	---	---	---
Sample volume, Chloride* (mL):				50	50	

* - Taken at CRF, not included in total reported in this report.

Table 1. Metals Results

Parameter	EPA Method	Acurex - CRF Sample ID A0929 0907 M5I-1	 A0929 0907 M5I-2	 A0929 0907 M5I-3	 Q0929 1400 TSK	E0929 0920 M5I-1 Spike
		mg/L	mg/L	mg/L	mg/L	% Recov
Chromium (hex.)	218.4	0.11	0.026	0.014	2.7	94
Sample volume, Total (mL):		360	145	137	400	1460
Sample volume, Used (mL):		100	100	100	100	100
Sample Weight, Ash (g):		---	---	---	100.22	---
Sample volume, Chloride* (mL):		50	50			

* - Taken at CRF, not included in total reported in this report.

Table 1. Metals Results

Acurex - CRF Sample ID

Parameter	EPA Method	E0929 0920 M5I-1 MSD RPD	Method Blank mg/L	Method Detection Limit mg/L
Chromium (hex.)	218.4	24	<0.003	0.003
Sample volume, Total (mL):		1460	100	
Sample volume, Used (mL):		100	100	
Sample Weight, Ash (g):		---	---	

ACUREX Corporation

Environmental Systems Division

November 1, 1988
Acurex ID: 8810018
Client PO: 8327
Page 1 of 5
Rev. 12/21/88

Acurex - CRF

Attention: Larry Waterland

Subject: Analysis of 17 Water Samples, Received 10/4/88.

Water samples were analyzed for requested metals using inductively coupled argon plasma spectroscopy or atomic absorption spectroscopy following methods for chemical analysis of water and wastes. The EPA method employed is listed alongside of the parameter. Samples were digested according to EPA protocol prior to analysis. The results are presented in Table 1.

If you should have any technical questions, please contact Robert DeRosier at (415)961-5700.

Submitted by: ______________________
Maryann Gambino
Supervisor, Inorganic Chemistry

Approved by: ______________________
Robert DeRosier
Client Services Manager

Approved by: David R. Taylor
David R. Taylor, Ph.D.
Quality Assurance Manager

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485 Clyde Avenue, P.O. Box 7044, Mountain View, CA 94039 (415) 961-5700 Telex 325961 FAX (415) 964-5145

Table 1. Metals Results

		Acurex-CRF Sample ID				
		B0907 1135	B0907 1235	B0907 1335	B0907 1435	B0907 1529
Parameter	EPA Method	mg/L	mg/L	mg/L	mg/L	mg/L
Arsenic	206.2	0.068	0.087	0.11	0.15	0.13
Barium	200.7	1.1	1.2	1.2	1.4	1.3
Bismuth		2.2	3.1	3.4	4.6	2.8
Cadmium	200.7	0.14	0.19	0.21	0.37	0.28
Chromium	200.7	0.27	0.37	0.39	0.68	0.59
Copper	200.7	2.4	2.7	2.0	3.6	2.9
Lead	200.7	1.9	2.2	1.5	2.4	1.7
Magnesium	200.7	16	18	18	22	19
Strontium		1.9	2	1.9	2	1.7
Sample volume (mL):		236	232	210	235	220
Volume used (mL):		100	100	100	100	100
Dilution factor:		1	1	1	1	1

Note: Dilution factors are already incorporated in above data.

Table 1. Metals Results

Parameter	EPA Method	Acurex-CRF Sample ID F0823 1331 mg/L	F0830 1148 mg/L	F0907 1241 mg/L	E0907 1157M5 I1, I2 mg/L	E0907 1157M5 I3 mg/L
Arsenic	206.2	2300	2400	2400	<0.01	<0.01
Barium	200.7	1800	2400	2500	0.028	0.056
Bismuth		6600	7400	9400	0.2	0.29
Cadmium	200.7	410	530	520	<0.01	<0.01
Chromium	200.7	2300	2900	3100	0.015	0.011
Copper	200.7	23000	30000	32000	0.17	0.23
Lead	200.7	2400	3100	3200	<0.001	<0.001
Magnesium	200.7	3400	4300	4400	<0.05	0.62
Strontium		11000	14000	15000	<0.01	0.06

Sample volume (mL):	--	--	--	920	220
Volume used (mL):	2	2	2	100	100
Dilution factor:	50	50	50	1	1
Chloride aliquot* (mL):	--	--	--	100	--

Note: Dilution factors are already incorporated in above data.

* - Aliquot taken at CRF, not included in above sample volume.

Table 1. Metals Results

		Acurex-CRF Sample ID				
		E0907 1157M5 I4	E0907 1157M5 FW	A0907 1129M17 I1, I2	A0907 1129M17 I4	A0907 1129M17 FW
Parameter	EPA Method	mg/L	mg/L	mg/L	mg/L	mg/L
Arsenic	206.2	<0.02	<0.05	0.027	<0.01	<0.02
Barium	200.7	0.087	<0.05	5.1	0.67	<0.02
Bismuth		<0.2	<0.5	1.8	0.99	0.64
Cadmium	200.7	<0.02	<0.05	0.22	0.069	0.28
Chromium	200.7	0.025	0.2	161	0.26	0.7
Copper	200.7	0.38	0.78	4.2	0.61	7.9
Lead	200.7	0.0057	0.11	1.3	0.17	0.16
Magnesium	200.7	0.98	<0.25	2.8	1.1	1.3
Strontium		0.06	<0.05	0.16	0.11	<0.02

Sample volume (mL):	122	59	1061	305	90
Volume used (mL):	50	20	100	100	50
Dilution factor:	2	5	1	1	2
Chloride aliquot* (mL):	--	--	100	--	--

Note: Dilution factors are already incorporated in above data.

* - Aliquot taken at CRF, not included in above sample volume.

Table 1. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	E0907 1157MS I1, I2 Spike	E0907 1157MS I1, I2 MSD	Method Blank	Method Detection Limit
		% Recov	RPD	mg/L	mg/L
Arsenic	206.2	81	1.6	<0.01	0.01
Barium	200.7	105	3.0	<0.01	0.01
Bismuth		90	15	<0.1	0.1
Cadmium	200.7	105	0.94	<0.01	0.01
Chromium	200.7	104	2.2	<0.01	0.01
Copper	200.7	99	2.3	<0.01	0.01
Lead	200.7	106	6.7	<0.001	0.001
Magnesium	200.7	97	2.4	<0.05	0.05
Strontium		109	0.94	<0.01	0.01

Sample volume (mL):	920	920	100
Volume used (mL):	100	100	100
Dilution factor:	1	1	1

Note: Dilution factors are already incorporated in above data.

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Environmental Systems Division

Acurex - CRF

November 8, 1988
Acurex ID: 8810019
Client PO: 8327
Page 1 of 5
Rev. 12/21/88

Attention: Larry Waterland

Subject: Analysis of 5 Solid Samples, Received 10/4/88.

Filter samples and solid samples were analyzed for requested metals using Inductively Coupled Argon Plasma Spectroscopy or atomic absorption spectrometry following Test Methods for Evaluating Solid Waste. The EPA method employed is listed alongside of the parameter. Samples were prepared using EPA method 3050 by digesting the sample in acid prior to analysis. The results are presented in Tables 1 and 2.

If you should have any technical questions, please contact Robert DeRosier at (415)961-5700.

Submitted by: ______________________
Maryann Gambino
Supervisor, Inorganic Chemistry

Approved by: ______________________
Robert DeRosier
Client Services Manager

Approved by: David R. Taylor
David R. Taylor, PhD
Quality Assurance Manager

These results were obtained by following standard laboratory procedures; the liability of Acurex Corporation shall not exceed the amount paid for this report. In no event shall Acurex be liable for special or consequential damages.

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Table 1. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	E0830 1117 M5 mg/filt	E0907 1157 M5 mg/filt	Spike % Recov	Dup Spike RPD	Method Blank mg/L
Arsenic	7060	0.048	0.037	77	19	<0.01
Barium	6010	0.018	0.023	104	3.7	0.035
Bismuth		2.3	1.6	64	16	<0.1
Cadmium	6010	0.34	0.22	93	0.44	<0.01
Chromium	6010	0.09	0.12	94	0.99	0.026
Copper	6010	2.7	2.1	94	2.2	<0.01
Lead	6010	1.5	1.0	100	0	<0.05
Magnesium	6010	0.66	0.74	122	13	1.3
Strontium		0.15	0.17	104	23	<0.01

Table 1. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	Method Detection Limit mg/kg
Arsenic	7060	1
Barium	6010	1
Bismuth		10
Cadmium	6010	1
Chromium	6010	1
Copper	6010	1
Lead	6010	5
Magnesium	6010	5
Strontium		1

Table 2. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	T0926 1345 mg/kg	T0928 1231 mg/kg	T0929 1200 mg/kg	T0929 1200 Spike % Recov	T0929 1200 Dup Spike RPD
Chromium	6010	75	110	86	115	7.9

Table 2. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	Method Blank mg/L	Method Detection Limit mg/kg
Chromium	6010	<0.01	1

ACUREX Corporation

Environmental Systems Division

Acurex - CRF

November 8, 1988
Acurex ID: 8810031
Client PO: 8327
Page 1 of 6
Rev. 12/21/88

Attention: Larry Waterland

Subject: Analysis of 17 Samples, Received 10/6/88.

Water samples were analyzed for requested metals using inductively coupled argon plasma spectroscopy or atomic absorption spectroscopy following methods for chemical analysis of water and wastes. The EPA method employed is listed alongside of the parameter. Samples were digested according to EPA protocol prior to analysis. The results are presented in Table 1.

Filter samples were analyzed for requested metals using Inductively Coupled Argon Plasma Spectroscopy or atomic absorption spectrometry following Test Methods for Evaluating Solid Waste. The EPA method employed is listed alongside of the parameter. Samples were prepared using EPA method 3050 by digesting the sample in acid prior to analysis. The results are presented in Table 2.

If you should have any technical questions, please contact Robert DeRosier at (415)961-5700.

Submitted by: ______________________
Maryann Gambino
Supervisor, Inorganic Chemistry

Approved by: ______________________
Robert DeRosier
Client Services Manager

Approved by: David R. Taylor
David R. Taylor, PhD
Quality Assurance Manager

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Table 1. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	B0909 1125 mg/L	B0909 1225 mg/L	B0909 1325 mg/L	B0909 1425 mg/L	B0909 1520 mg/L
Arsenic	206.2	0.023	0.052	0.075	0.089	0.077
Barium	200.7	0.8	0.93	0.85	0.81	0.79
Bismuth		0.92	2.7	3.1	2.7	2.0
Cadmium	200.7	0.071	0.19	0.28	0.23	0.29
Chromium	200.7	0.095	0.29	0.47	0.36	0.4
Copper	200.7	0.81	1.8	2.3	1.7	1.8
Lead	200.7	0.61	1.5	1.9	1.2	1.1
Magnesium	200.7	9.4	21	25	21	20
Strontium		0.88	1.1	1.1	1.1	1.0

Sample volume (mL):	194	234	212	224	230
Volume used (mL):	100	100	100	100	100
Dilution factor:	1	1	1	1	1
Chloride aliquot* (mL):	--	--	--	--	--

NOTE: Dilution factors are already incorporated in above data.

* - Aliquot taken at CRF, not included in above sample volume.

Table 1. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	F0909 1300	E0909 1126M5 I-1,I-2	E0909 1126M5 I-3	E0909 1126M5 I-4	E0909 1126M5 PW
		mg/L	mg/L	mg/L	mg/L	mg/L
Arsenic	206.2	2300	<0.01	<0.01	<0.02	<0.05
Barium	200.7	2500	0.028	0.061	0.1	<0.05
Bismuth		11000	0.47	<0.1	<0.2	<0.5
Cadmium	200.7	540	<0.01	<0.01	0.029	0.069
Chromium	200.7	3000	0.013	0.013	0.023	0.053
Copper	200.7	31000	0.46	0.21	0.18	0.71
Lead	200.7	3100	<0.001	<0.001	0.0027	0.075
Magnesium	200.7	4600	0.13	0.6	1.2	<0.25
Strontium		16000	<0.01	<0.01	<0.02	<0.05

Sample volume (mL):	--	1050	228	108	80
Volume used (mL):	2	100	100	50	20
Dilution factor:	50	1	1	2	5
Chloride aliquot* (mL):	--	100	--	--	--

NOTE: Dilution factors are already incorporated in above data.

* - Aliquot taken at CRF, not included in above sample volume.

Table 1. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	A0909 1122M17 I-1,I-2	A0909 1122M17 I-3	A0909 1122M17 I-4	A0909 1122M17 PW	E0909 1126M5 Spike
		mg/L	mg/L	mg/L	mg/L	% Recov
Arsenic	206.2	<0.01	<0.01	<0.01	0.031	86
Barium	200.7	5.3	2.1	0.29	0.11	104
Bismuth		3.0	<0.1	<0.1	4.8	83
Cadmium	200.7	1.0	<0.01	<0.01	2.7	102
Chromium	200.7	810	0.31	0.15	50	102
Copper	200.7	19	0.23	0.23	19	84
Lead	200.7	6.6	0.016	0.0086	4.1	122
Magnesium	200.7	6.5	1.4	0.99	120	98
Strontium		0.11	0.05	<0.01	0.21	103

Sample volume (mL):	815	524	580	200	1050
Volume used (mL):	100	100	100	100	100
Dilution factor:	1	1	1	1	1
Chloride aliquot* (mL):	100	--	--	--	--

NOTE: Dilution factors are already incorporated in above data.

* - Aliquot taken at CRF, not included in above sample volume.

Table 1. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	E0909 1126M5 Dup Spike RPD	Method Blank mg/L	Method Detection Limit mg/L
Arsenic	206.2	4.2	<0.01	0.01
Barium	200.7	0.93	<0.01	0.01
Bismuth		0.77	<0.1	0.1
Cadmium	200.7	1.7	<0.01	0.01
Chromium	200.7	0.77	<0.01	0.01
Copper	200.7	2.0	<0.01	0.01
Lead	200.7	2.1	<0.001	0.001
Magnesium	200.7	1.4	<0.05	0.05
Strontium		3.3	<0.01	0.01
Sample volume (mL):		1050	100	
Volume used (mL):		100	100	
Dilution factor.		1	1	

NOTE: Dilution factors are already incorporated in above data.

Table 2. Metals Results

Parameter	EPA Method	Acurex-CRF Sample ID E0909 1126 M5F mg/filt*	Spike % Recov	Dup Spike RPD	Method Blank mg/L	Method Detection Limit mg/kg
Arsenic	7060	0.039	77	19	<0.01	1
Barium	6010	0.018	104	3.7	0.035	1
Bismuth		1.4	64	16	<0.2	20
Cadmium	6010	0.27	93	0.44	<0.01	1
Chromium	6010	0.041	94	0.99	0.026	1
Copper	6010	2.1	94	2.2	<0.01	1
Lead	6010	1.4	100	0	<0.05	5
Magnesium	6010	0.64	122	13	1.3	5
Strontium		0.14	104	23	<0.02	2

* - 0.1 liter after digestion

ACUREX
Corporation

Environmental Systems Division

Acurex - CRF

November 17, 1988
Acurex ID: 8810035
Client PO: 8327
Page 1 of 6
Rev. 12/21/88

Attention: Larry Waterland

Subject: Analysis of 17 Samples, Received 10/6/88.

Water samples were analyzed for requested metals using inductively coupled argon plasma spectroscopy or atomic absorption spectroscopy following methods for chemical analysis of water and wastes. The EPA method employed is listed alongside of the parameter. Samples were digested according to EPA protocol prior to analysis. The results are presented in Table 1.

The filter sample was analyzed for requested metals using Inductively Coupled Argon Plasma Spectroscopy or atomic absorption spectrometry following Test Methods for Evaluating Solid Waste. The EPA method employed is listed alongside of the parameter. Samples were prepared using EPA method 3050 by digesting the sample in acid prior to analysis. The results are presented in Table 2.

If you should have any technical questions, please contact Robert DeRosier at (415)961-5700.

Submitted by: ____________________
Maryann Gambino
Supervisor, Inorganic Chemistry

Approved by: ____________________
Robert DeRosier
Client Services Manager

Approved by: David R. Taylor
David R. Taylor, PhD.
Quality Assurance Manager

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Table 1. Metals Results

Parameter	EPA Method	B0914 0928 mg/L	B0914 1140 mg/L	B0914 1240 mg/L	B0914 1340 mg/L	B0914 1440 mg/L
		Acurex-CRF Sample ID				
Arsenic	206.2	<0.01	0.07	0.11	0.14	0.18
Barium	200.7	0.45	0.31	0.3	1.6	1.6
Bismuth		0.24	0.6	1	1.3	2
Cadmium	200.7	0.02	0.05	0.07	0.1	0.16
Chromium	200.7	0.06	0.17	0.21	0.29	0.34
Copper	200.7	0.25	0.32	0.34	0.42	0.46
Lead	200.7	0.031	<0.001	0.039	<0.001	<0.001
Magnesium	200.7	6	7.4	8.8	13	15
Strontium		0.4	0.53	0.58	0.63	0.68
Sample volume (mL):		214	232	242	228	236
Volume used (mL):		100	100	100	100	100
Dilution factor:		1	1	1	1	1

NOTE: Dilution factors are incorporated in above results.

Table 1. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	F0914 0947	E0914 0932M5 I-1,I-2	E0914 0932M5 I-3	E0914 0932M5 I-4	E0914 0932M5 PW
		mg/L	mg/L	mg/L	mg/L	mg/L
Arsenic	206.2	2800	0.02	<0.01	<0.01	<0.05
Barium	200.7	2300	<0.01	0.05	0.04	<0.05
Bismuth		10000	<0.1	<0.1	<0.1	<0.5
Cadmium	200.7	605	<0.01	<0.01	<0.01	<0.05
Chromium	200.7	3100	<0.01	<0.01	0.01	0.25
Copper	200.7	29000	<0.01	0.06	0.06	0.17
Lead	200.7	3400	<0.001	<0.001	<0.001	0.014
Magnesium	200.7	4600	0.06	0.23	0.25	<0.25
Strontium		18000	<0.01	0.05	0.02	<0.05
Sample volume (mL):		--	1096	405	270	75
Volume used (mL):		2	100	100	100	20
Dilution factor:		50	1	1	1	5

NOTE: Dilution factors are incorporated in above results.

Table 1. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	A0914 0928M17 I-1,I-2 mg/L	A0914 0928M17 I-3 mg/L	A0914 0928M17 I-4 mg/L	A0914 0928M17 PW mg/L	Spike % Recov
Arsenic	206.2	0.27	<0.01	<0.01	0.03	86
Barium	200.7	0.5	0.1	0.05	0.02	97
Bismuth		19	<0.1	<0.1	0.47	123
Cadmium	200.7	0.31	<0.01	<0.01	0.91	103
Chromium	200.7	310	<0.05	0.031	2.2	97
Copper	200.7	6.8	0.08	0.07	0.61	92
Lead	200.7	1.8	0.013	0.0086	0.21	105
Magnesium	200.7	8.5	0.21	0.2	4.2	94
Strontium		0.1	<0.01	0.02	0.06	108
Sample volume (mL):		1200	750	740	190	1096
Volume used (mL):		100	100	100	100	100
Dilution factor:		1	1	1	1	1

NOTE: Dilution factors are incorporated in above results.

Table 1. Metals Results

		Acurex-CRF Sample ID		
		Dup Spike	Method Blank	Method Detection Limit
Parameter	EPA Method	RPD	mg/L	mg/L
Arsenic	206.2	9.2	<0.01	0.01
Barium	200.7	7.6	<0.01	0.01
Bismuth		37	<0.1	0.1
Cadmium	200.7	5.2	<0.01	0.01
Chromium	200.7	6.5	0.011	0.01
Copper	200.7	7.6	<0.01	0.01
Lead	200.7	11	<0.001	0.001
Magnesium	200.7	5.3	<0.05	0.05
Strontium		5.1	<0.01	0.01
Sample volume (mL):		1096	100	
Volume used (mL):		100	100	
Dilution factor:		1	1	

NOTE: Dilution factors are incorporated in above results.

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8810035
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Table 2. Metals Results

		Acurex-CRF Sample ID				
		E0914 0932 M5F	Spike	Dup Spike	Method Blank	Method Detection Limit
Parameter	EPA Method	mg/filt	% Recov	RPD	mg/L	mg/filt
Arsenic	7060	0.01	77	19	<0.01	0.005
Barium	6010	0.01	104	3.7	0.035	0.001
Bismuth		0.49	64	16	<0.2	0.02
Cadmium	6010	0.08	93	0.44	<0.01	0.001
Chromium	6010	0.04	94	0.99	0.026	0.001
Copper	6010	0.04	94	2.2	<0.01	0.001
Lead	6010	0.033	100	0	<0.001	0.0001
Magnesium	6010	0.4	122	13	1.3	0.005
Strontium		0.1	104	23	<0.02	0.002

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Environmental Systems Division

Acurex - CRF

December 14, 1988
Acurex ID: 8810038
Client PO: 8327
Page 1 of 6

Attention: Larry Waterland

Subject: Analysis of 15 Samples, Received 10/10/88.

Samples B09161309 and B09161409 were broken upon arrival.

Water samples were analyzed for requested metals using inductively coupled argon plasma spectroscopy or atomic absorption spectroscopy following methods for chemical analysis of water and wastes. The EPA method employed is listed alongside of the parameter. Samples were digested according to EPA protocol prior to analysis. The results are presented in Table 1.

The filter sample was analyzed for requested metals using Inductively Coupled Argon Plasma Spectroscopy or atomic absorption spectrometry following Test Methods for Evaluating Solid Waste. The EPA method employed is listed alongside of the parameter. Samples were prepared using EPA method 3050 by digesting the sample in acid prior to analysis. The results are presented in Table 2.

If you should have any technical questions, please contact Robert DeRosier at (415)961-5700.

Submitted by: Maryann Gambino
Supervisor, Inorganic Chemistry

Approved by: Robert DeRosier
Client Services Manager

Approved by: David R. Taylor
David R. Taylor, Ph.D.
Quality Assurance Manager

These results were obtained by following standard laboratory procedures; the liability of Acurex Corporation shall not exceed the amount paid for this report. In no event shall Acurex be liable for special or consequential damages.

485 Clyde Avenue, P.O Box 7044, Mountain View, CA 94039 (415) 961-5700 Telex 325961 FAX (415) 964-5145

Table 1. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	B0916 1109 mg/L	B0916 1209 mg/L	B0916 1525 mg/L	F0916 1120 mg/L	E0916 1119M5 I-1,I-2 mg/L
Arsenic	206.2	0.14	0.078	0.23	2900	<0.01
Barium	200.7	1.4	1.1	2.9	2400	0.018
Bismuth		2.5	1.1	2.4	11000	<0.1
Cadmium	200.7	0.2	0.12	0.38	540	0.013
Chromium	200.7	0.22	0.13	0.35	2900	<0.01
Copper	200.7	1.6	1.1	1.4	30000	0.11
Lead	239.2	1.1	0.69	0.93	3000	0.052
Magnesium	200.7	18	14	17	4500	<0.05
Strontium		1.9	2.1	1.4	15000	<0.01
Sample volume (mL):		228	244	236	--	1320
Volume used (mL):		100	100	100	2	100
Dilution factor:		1	1	1	50	1
Chloride aliquot (mL):*		--	--	--	--	100

NOTE: Dilution factors are already incorporated in above results.

* - Taken at CRF, not included in above sample volume.

Table 1. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	E0916 1119M5 I-3	E0916 1119M5 I-4	E0916 1119M5 PW	A0916 1110M17 I-1,I-2	A0916 1110M17 I-3
		mg/L	mg/L	mg/L	mg/L	mg/L
Arsenic	206.2	0.011	<0.01	<0.05	0.11	<0.01
Barium	200.7	0.027	0.041	<0.05	4.8	0.82
Bismuth		0.34	<0.1	<0.5	5.2	<0.1
Cadmium	200.7	0.053	0.024	<0.05	0.25	<0.01
Chromium	200.7	0.015	0.013	0.16	290	0.14
Copper	200.7	0.44	0.27	0.14	5.5	0.15
Lead	239.2	0.15	0.11	0.11	1.9	0.019
Magnesium	200.7	0.12	0.22	<0.25	13	0.4
Strontium		<0.01	0.02	<0.05	0.16	0.02
Sample volume (mL):		420	184	49	1330	370
Volume used (mL):		100	100	20	100	100
Dilution factor:		1	1	5	1	1
Chloride aliquot (mL):*		--	--	--	1	--

NOTE: Dilution factors are already incorporated in above results.

* - Taken at CRF, not included in above sample volume.

Table 1. Metals Results

		Acurex-CRF Sample ID				
Parameter	EPA Method	A0916 1110M17 I-4 mg/L	A0916 1110M5 PW mg/L	E0916 1119M5 I-1,I-2 Spike % Recov	E0916 1119M5 I-1,I-2 MSD RPD	Method Blank mg/L
Arsenic	206.2	<0.01	0.062	88	3.4	<0.01
Barium	200.7	0.13	0.012	105	2.7	<0.01
Bismuth		<0.1	4.0	98	0.97	<0.1
Cadmium	200.7	<0.01	1.5	106	2.5	<0.01
Chromium	200.7	0.078	5.2	108	2.6	<0.01
Copper	200.7	0.12	13	102	2.4	<0.01
Lead	239.2	0.0089	1.3	116	6.4	<0.001
Magnesium	200.7	0.26	17	103	0.97	<0.05
Strontium		0.02	0.03	106	3.1	<0.01
Sample volume (mL):		270	224	1320	1320	100
Volume used (mL):		100	100	100	100	100
Dilution factor:		1	1	1	1	1

NOTE: Dilution factors are already incorporated in above results.

Table 1. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	Method Detection Limit mg/L
Arsenic	206.2	0.01
Barium	200.7	0.01
Bismuth		0.1
Cadmium	200.7	0.01
Chromium	200.7	0.01
Copper	200.7	0.01
Lead	239.2	0.001
Magnesium	200.7	0.05
Strontium		0.01

Table 2. Metals Results

		Acurex-CRF Sample ID				
		E0916 1125M5 F	Spike	Dup Spike	Method Blank	Method Detection Limit
Parameter	EPA Method	mg/filt	% Recov	RPD	mg/L	mg/filt
Arsenic	7060	0.079	70	3.6	<0.01	0.001
Barium	6010	0.019	91	1.2	0.033	0.001
Bismuth		1.8	93	1.1	<0.1	0.01
Cadmium	6010	0.3	91	2.5	<0.01	0.001
Chromium	6010	0.086	89	0.87	0.022	0.001
Copper	6010	2.5	77	1.9	0.019	0.001
Lead	6010	1.3	95	1.7	<0.05	0.005
Magnesium	6010	0.69	102	4.3	1.3	0.005
Strontium		0.16	123	14	<0.01	0.001

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Environmental Systems Division

Acurex-CRF

November 18, 1988
Acurex ID: 8810043
Client PO: 8327
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Rev. 12/21/88

Attention: Larry Waterland

Subject: Analysis of 1 Filter and 15 Water Samples, Received 10/12/88.

Water samples were analyzed for requested metals using inductively coupled argon plasma spectroscopy or atomic absorption spectroscopy following methods for chemical analysis of water and wastes. Sample B09201414 was broken upon arrival. The EPA method employed is listed alongside of the parameter. Samples were digested according to EPA protocol prior to analysis. The results are presented in Table 1.

The filter sample was analyzed for requested metals using Inductively Coupled Argon Plasma Spectroscopy or atomic absorption spectroscopy following Test Methods for Evaluating Solid Waste. The EPA method employed is listed alongside of the parameter. Samples were prepared using EPA method 3050 by digesting the sample in acid prior to analysis. The results are presented in Table 2.

If you should have any technical questions, please contact Robert DeRosier at (415)961-5700.

Submitted by: ____________________
Maryann Gambino
Supervisor, Inorganic Chemistry

Approved by: ____________________
Robert DeRosier
Client Services Manager

Approved by: David R. Taylor
David R. Taylor, PhD.
Quality Assurance Manager

These results were obtained by following standard laboratory procedures; the liability of Acurex Corporation shall not exceed the amount paid for this report. In no event shall Acurex be liable for special or consequential damages.

Table 1. Metals Results

		Acurex-CRF Sample ID				
		B0920 1014	B0920 1114	B0920 1214	B0920 1314	B0920 1514
Parameter	EPA Method	mg/L	mg/L	mg/L	mg/L	mg/L
Arsenic	206.2	<0.01	0.06	0.12	0.14	0.14
Barium	200.7	0.83	1.5	1.3	1.4	1.2
Bismuth		0.72	2.1	4.3	4.0	4.0
Cadmium	200.7	0.05	0.27	0.4	0.4	0.48
Chromium	200.7	0.07	0.21	0.47	0.55	2.1
Copper	200.7	0.65	1.3	2.6	2.8	2.8
Lead	200.7	0.29	0.81	1.5	1.2	1.1
Magnesium	200.7	7.3	13	16	17	15
Strontium		1.0	1.4	1.4	1.2	0.92
Sample volume (mL):		236	232	229	212	248
Volume used (mL):		100	100	100	100	100
Dilution factor:		1	1	1	1	1

NOTE: Dilution factors are already incorporated in above data.

Table 1. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	B0920 1558 mg/L	F0920 1022 mg/L	E0920 1045M5 I-1,I-2 mg/L	E0920 1045M5 I-3 mg/L	E0920 1045M5 I-4 mg/L
Arsenic	206.2	0.11	3600	<0.01	<0.02	<0.05
Barium	200.7	2.3	2500	0.08	0.04	0.06
Bismuth		2.1	11000	0.2	<0.2	<0.5
Cadmium	200.7	0.64	640	<0.01	<0.02	<0.05
Chromium	200.7	0.42	3300	<0.01	<0.02	0.05
Copper	200.7	1.1	30000	0.88	0.12	<0.05
Lead	200.7	<0.001	3500	0.02	0.036	0.031
Magnesium	200.7	13	4900	0.93	0.26	0.36
Strontium		1.0	19000	0.08	<0.02	<0.05
Sample volume (mL):		232	--	1360	139	102
Volume used (mL):		100	2	100	50	20
Dilution factor:		1	50	1	2	5
Chloride aliquot* (mL):		--	--	100	--	--

NOTE: Dilution factors are already incorporated in above data.

* - Aliquot taken at CRF, not included in sample volume listd above.

Table 1. Metals Results

		Acurex-CRF Sample ID				
		E0920 1045M5 PW	A0920 1014M17 I-1,I-2	A0920 1014M17 I-3	A0920 1014M17 I-4	A0920 1014M17 PW
Parameter	EPA Method	mg/L	mg/L	mg/L	mg/L	mg/L
Arsenic	206.2	<0.05	0.18	0.02	0.02	2.1
Barium	200.7	<0.05	4.9	0.81	2.4	0.4
Bismuth		<0.5	16	2.1	2.7	8.2
Cadmium	200.7	<0.05	0.7	0.13	0.14	4.0
Chromium	200.7	0.06	1500	0.24	4.1	140
Copper	200.7	<0.05	17	0.71	0.93	42
Lead	200.7	0.016	6.4	0.31	0.46	8.2
Magnesium	200.7	<0.25	14	0.36	0.69	150
Strontium		<0.05	0.16	0.03	0.05	1.1
Sample volume (mL):		76	1380	455	475	90
Volume used (mL):		20	100	100	100	20
Dilution factor:		5	1	1	1	5
Chloride aliquot* (mL):		--	2	--	--	--

NOTE: Dilution factors are already incorporated in above data.

* - Aliquot taken at CRF, not included in sample volume listd above.

Table 1. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	E0920 1045M5 I-1,I-2 Spike % Recov	E0920 1045M5 I-1,I-2 Dup Spike RPD	Method Blank mg/L	Method Detection Limit mg/L
Arsenic	206.2	89	9.3	<0.01	0.01
Barium	200.7	93	4.2	<0.01	0.01
Bismuth		84	7.4	<0.1	0.1
Cadmium	200.7	101	2.9	<0.01	0.01
Chromium	200.7	97	3.9	<0.01	0.01
Copper	200.7	83	2.9	<0.01	0.01
Lead	200.7	109	5.1	<0.001	0.001
Magnesium	200.7	91	2.8	<0.05	0.05
Strontium		107	2.6	<0.01	0.01

Sample volume (mL):	1360	1360	100
Volume used (mL):	100	100	100
Dilution factor:	1	1	1

NOTE: Dilution factors are already incorporated in above data.

Table 2. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	E0920 1045 M5F mg/filt	Spike % Recov	Dup Spike RPD	Method Blank mg/L	Method Detection Limit mg/filt
Arsenic	7060	0.02	70	3.6	<0.01	0.005
Barium	6010	0.01	91	1.2	0.033	0.001
Bismuth		0.8	93	1.1	<0.1	0.01
Cadmium	6010	0.13	91	2.5	<0.01	0.001
Chromium	6010	0.04	89	0.87	0.022	0.001
Copper	6010	0.99	77	1.9	0.019	0.001
Lead	6010	0.49	95	1.7	<0.05	0.005
Magnesium	6010	0.42	102	4.3	1.3	0.005
Strontium		0.1	123	14	0.29	0.001

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Environmental Systems Division

Acurex - CRF

December 15, 1988
Acurex ID: 8810048
Client PO: 8327
Page 1 of 6

Attention: Larry Waterland

Subject: Analysis of 15 Samples, Received 10/13/88.

Water samples were analyzed for requested metals using inductively coupled argon plasma spectroscopy or atomic absorption spectroscopy following methods for chemical analysis of water and wastes. The EPA method employed is listed alongside of the parameter. Samples were digested according to EPA protocol prior to analysis. The results are presented in Table 1.

The filter sample was analyzed for requested metals using Inductively Coupled Argon Plasma Spectroscopy or atomic absorption spectrometry following Test Methods for Evaluating Solid Waste. The EPA method employed is listed alongside of the parameter. Samples were prepared using EPA method 3050 by digesting the sample in acid prior to analysis. The results are presented in Table 2.

If you should have any technical questions, please contact Robert DeRosier at (415)961-5700.

Submitted by: Maryann Gambino
Supervisor, Inorganic Chemistry

Approved by: Robert DeRosier
Client Services Manager

Approved by: David R Taylor
David R. Taylor, Ph.D.
Quality Assurance Manager

These results were obtained by following standard laboratory procedures; the liability of Acurex Corporation shall not exceed the amount paid for this report. In no event shall Acurex be liable for special or consequential damages.

Table 1. Metals Results

Parameter	EPA Method	B0922 0942	B0922 1042	B0922 1142	B0922 1242	B0922 1343
		mg/L	mg/L	mg/L	mg/L	mg/L
Arsenic	206.2	0.015	0.1	0.11	0.13	0.15
Barium	200.7	0.8	1.3	1.4	1.4	1.1
Bismuth		1.3	4.8	5.8	5.2	6.0
Cadmium	200.7	0.096	0.35	0.35	0.4	0.42
Chromium	200.7	0.14	0.43	0.56	0.65	0.73
Copper	200.7	1.1	3.3	4.5	4.6	5.0
Lead	239.2	0.75	1.5	1.9	1.9	1.8
Magnesium	200.7	7.8	14	18	17	15
Strontium		1.2	1.5	1.6	1.6	1.2
Sample volume (mL):		234	206	216	238	228
Volume used (mL):		100	100	100	100	100
Dilution factor:		1	1	1	1	1

(The column headings B0922 0942 to B0922 1343 appear under the spanning heading "Acurex-CRF Sample ID".)

NOTE: Dilution factors are already incorporated in above data.

Table 1. Metals Results

		Acurex-CRF Sample ID				
Parameter	EPA Method	F0922 1050 mg/L	E0922 0950 M5 I-1,I-2 mg/L	E0922 0950 M5 I-3 mg/L	E0922 0950 M5 I-4 mg/L	E0922 0950 M5 PW mg/L
Arsenic	206.2	3300	<0.01	<0.01	<0.01	<0.05
Barium	200.7	2300	0.015	0.041	0.046	<0.05
Bismuth		11000	<0.1	<0.1	0.15	<0.5
Cadmium	200.7	540	<0.01	<0.01	<0.01	<0.05
Chromium	200.7	2900	<0.01	<0.01	<0.01	0.084
Copper	200.7	30000	<0.01	0.023	0.044	0.2
Lead	239.2	3000	0.0061	0.0026	0.007	0.046
Magnesium	200.7	4300	<0.05	0.26	0.64	0.43
Strontium		17000	<0.01	<0.01	0.06	<0.05
Sample volume (mL):		--	1025	335	248	53
Volume used (mL):		2	100	100	100	20
Dilution factor:		50	1	1	1	5
Chloride aliquot (mL):*		--	100	--	--	--

NOTE: Dilution factors are already incorporated in above data.

* - Taken at CRF, not included in above sample volume.

Table 1. Metals Results

Parameter	EPA Method	Acurex-CRF Sample ID A0922 0942 M17 I-1,I-2 mg/L	A0922 0942 M17 I-3 mg/L	A0922 0942 M17 I-4 mg/L	A0922 0942 M17 PW mg/L	Spike % Recov
Arsenic	206.2	0.55	<0.01	<0.01	0.65	94
Barium	200.7	3.0	1.2	0.15	<0.05	96
Bismuth		19	0.15	<0.1	2.0	114
Cadmium	200.7	0.75	<0.01	<0.01	3.4	98
Chromium	200.7	740	0.7	0.25	3.4	98
Copper	200.7	21	0.17	0.12	49	95
Lead	239.2	6.4	0.011	0.0081	6.2	100
Magnesium	200.7	7.4	1.6	1.2	14	97
Strontium		0.08	0.15	0.1	<0.05	117

Sample volume (mL):	1100	410	530	212	1025
Volume used (mL):	100	100	100	20	100
Dilution factor:	1	1	1	5	1
Chloride aliquot (mL):*	100	--	--	--	--

NOTE: Dilution factors are already incorporated in above data.

* - Taken at CRF, not included in above sample volume.

Table 1. Metals Results

		Acurex-CRF Sample ID		
		Dup Spike	Method Blank	Method Detection Limit
Parameter	EPA Method	RPD	mg/L	mg/L
Arsenic	206.2	5.3	<0.01	0.01
Barium	200.7	3.9	<0.01	0.01
Bismuth		13	<0.1	0.1
Cadmium	200.7	4.3	<0.01	0.01
Chromium	200.7	2.9	<0.01	0.01
Copper	200.7	4.0	<0.01	0.01
Lead	239.2	3.4	<0.001	0.01
Magnesium	200.7	2.2	<0.05	0.05
Strontium		6.3	<0.01	0.01

Sample volume (mL):	1025	100
Volume used (mL):	100	100
Dilution factor:	1	1

NOTE: Dilution factors are already incorporated in above data.

Table 2. Metals Results

Parameter	EPA Method	Acurex-CRF Sample ID E0922 0950 M5F	Spike	Dup Spike	Method Blank	Method Detection Limit
		mg/filt	% Recov	RPD	mg/L	mg/filt
Arsenic	7060	0.055	70	3.6	<0.01	0.001
Barium	6010	0.012	91	1.2	0.033	0.001
Bismuth		2.4	93	1.1	<0.1	0.01
Cadmium	6010	0.33	91	2.5	<0.01	0.001
Chromium	6010	0.087	89	0.87	0.022	0.001
Copper	6010	5.2	77	1.9	0.019	0.001
Lead	6010	2.0	95	1.7	<0.05	0.005
Magnesium	6010	0.73	102	4.3	1.3	0.005
Strontium		0.085	123	14	0.29	0.001

ACUREX
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Environmental Systems Division

Acurex-CRF

November 21, 1988
Acurex ID: 8810052
Client PO: 8327
Page 1 of 6

Attention: Larry Waterland

Subject: Analysis of 13 Water and 1 Filter Sample, Received 10/14/88.

Water samples were analyzed for requested metals using inductively coupled argon plasma spectroscopy or atomic absorption spectroscopy following methods for chemical analysis of water and wastes. The EPA method employed is listed alongside of the parameter. Samples were digested according to EPA protocol prior to analysis. The results are presented in Table 1.

The filter sample was analyzed for requested metals using Inductively Coupled Argon Plasma Spectroscopy or atomic absorption spectrometry following Test Methods for Evaluating Solid Waste. The EPA method employed is listed alongside of the parameter. Samples were prepared using EPA method 3050 by digesting the sample in acid prior to analysis. The results are presented in Table 2.

If you should have any technical questions, please contact Robert DeRosier at (415)961-5700.

Submitted by: ______________________
Maryann Gambino
Supervisor, Inorganic Chemistry

Approved by: ______________________
Robert DeRosier
Client Services Manager

Approved by: David R. Taylor
David R. Taylor, PhD.
Quality Assurance Manager

These results were obtained by following standard laboratory procedures; the liability of Acurex Corporation shall not exceed the amount paid for this report. In no event shall Acurex be liable for special or consequential damages.

485 Clyde Avenue, P.O. Box 7044, Mountain View, CA 94039 (415) 961-5700 Telex: 325961 FAX: (415) 964-5145

Table 1. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	B0926 1039	B0926 1139	B0926 1239	B0926 1330	F0926 1053
		mg/L	mg/L	mg/L	mg/L	mg/L
Chromium	200.7	0.56	0.40	1.1	1.3	3200
Sample volume (mL):		156	142	156	160	139
Volume used (mL):		100	100	100	100	50
Dilution factor:		1	1	1	1	2
Chloride aliquot* (mL):		--	--	--	--	--

NOTE: Dilution factors are already incorporated in above data.

* - Aliquot taken at CRF. Not included in above sample volume.

Table 1. Metals Results

		Acurex-CRF Sample ID				
		E0926 1047 M5T1-I1	E0926 1047 M5T1-I2	E0926 1047 M5T1-I3	E0926 1047 M5T1-PW	A0926 1039 M5T1-I1
Parameter	EPA Method	mg/L	mg/L	mg/L	mg/L	mg/L
Chromium	200.7	0.02	0.03	0.04	0.17	0.13
Sample volume (mL):		520	335	290	74	87
Volume used (mL):		100	100	100	20	20
Dilution factor:		1	1	1	5	5
Chloride aliquot* (mL):		50	50	50	--	50

NOTE: Dilution factors are already incorporated in above data.

* - Aliquot taken at CRF. Not included in above sample volume.

Table 1. Metals Results

		Acurex-CRF Sample ID				
		A0926 1039 M5T1-I2	A0926 1039 M5T1-I3	A0926 1039 M5T1-PW	E0926 1047 M5T1-I1 Spike	E0926 1047 M5T1-I1 MSD
Parameter	EPA Method	mg/L	mg/L	mg/L	% Recov	RPD
Chromium	200.7	0.1	1.7	0.07	98	1.6
Sample volume (mL):		114	108	76	520	520
Volume used (mL):		50	50	20	100	100
Dilution factor:		2	2	5	1	1
Chloride aliquot* (mL):		50	--	--	--	--

NOTE: Dilution factors are already incorporated in above data.

* - Aliquot taken at CRF. Not included in above sample volume.

Table 1. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	Method Blank mg/L	Method Detection Limit mg/L
Chromium	200.7	<0.01	0.01

Sample volume (mL):	100
Volume used (mL):	100
Dilution factor:	1

NOTE: Dilution factors are already incorporated in above data.

Table 2. Metals Results

		Acurex-CRF Sample ID				
		E0926 1047 M5T1F	Spike	Dup Spike	Method Blank	Method Detection Limit
Parameter	EPA Method	mg/filt	% Recov	RPD	mg/L	mg/filt
Chromium	6010	0.11	91	0.87	<0.01	0.1

ACUREX Corporation

Environmental Systems Division

Acurex - CRF

December 15, 1988
Acurex ID: 8810056
Client PO: 8327
Page 1 of 6

Attention: Larry Waterland

Subject: Analysis of 13 Water and 1 Filter Sample. Received 10/17/88.

Water samples were analyzed for requested metals using inductively coupled argon plasma spectroscopy or atomic absorption spectroscopy following methods for chemical analysis of water and wastes. The EPA method employed is listed alongside of the parameter. Samples were digested according to EPA protocol prior to analysis. The results are presented in Table 1.

The filter sample was analyzed for requested metals using Inductively Coupled Argon Plasma Spectroscopy or atomic absorption spectrometry following Test Methods for Evaluating Solid Waste. The EPA method employed is listed alongside of the parameter. Samples were prepared using EPA method 3050 by digesting the sample in acid prior to analysis. The results are presented in Table 2.

If you should have any technical questions, please contact Robert DeRosier at (415)961-5700.

Submitted by: ______________________
Maryann Gambino
Supervisor, Inorganic Chemistry

Approved by: David R. Taylor for
Robert DeRosier
Client Services Manager

Approved by: David R. Taylor
David R. Taylor, Ph.D.
Quality Assurance Manager

These results were obtained by following standard laboratory procedures; the liability of Acurex Corporation shall not exceed the amount paid for this report. In no event shall Acurex be liable for special or consequential damages.

Table 1. Metals Results

		Acurex-CRF Sample ID				
		B0928 0931	B0928 1031	B0928 1131	B0928 1228	F0928 0949
Parameter	EPA Method	mg/L	mg/L	mg/L	mg/L	mg/L
Chromium	200.7	0.13	0.32	0.39	0.41	3100
Sample volume (mL):		146	142	136	142	138
Volume used (mL):		100	100	50	100	50
Dilution factor:		1	1	2	1	2

NOTE: Dilution factors are already incorporated in above data.

Table 1. Metals Results

		Acurex-CRF Sample ID				
		E0928 0940 M5T1(I-1)	E0928 0940 M5T1(I-2)	E0928 0940 M5T1(I-3)	E0928 0940 M5T1PW	A0928 0931 M5T1(I-1)
Parameter	EPA Method	mg/L	mg/L	mg/L	mg/L	mg/L
Chromium	200.7	0.05	0.015	0.015	<0.05	0.04
Sample volume (mL):		880	400	365	50	110
Volume used (mL):		100	100	100	20	50
Dilution factor:		1	1	1	5	2

NOTE: Dilution factors are already incorporated in above data.

Table 1. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	A0928 0931 M5T1(I-2) mg/L	A0928 0931 M5T1(I-3) mg/L	A0928 0931 M5T1PW mg/L	Spike % Recov	Dup Spike RPD
Chromium	200.7	0.053	0.069	<0.05	101	0.19
Sample volume (mL):		130	110	42	880	880
Volume used (mL):		50	50	20	100	100
Dilution factor:		2	2	5	1	1

NOTE: Dilution factors are already incorporated in above data.

Table 1. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	Method Blank mg/L	Method Detection Limit mg/L
Chromium	200.7	<0.01	0.01

Sample volume (mL):	100
Volume used (mL):	100
Dilution factor:	1

NOTE: Dilution factors are already incorporated in above data.

Table 2. Metals Results

Parameter	EPA Method	Acurex-CRF Sample ID E0928 0940 M5T1F mg/filt	Spike % Recov	Dup Spike RPD	Method Blank mg/L	Method Detection Limit mg/filt
Chromium	6010	0.051	89	0.87	<0.01	0.1

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Environmental Systems Division

Acurex - CRF

December 15, 1988
Acurex ID: 8810057
Client PO: 8327
Page 1 of 6

Attention: Larry Waterland

Subject: Analysis of 13 Water and 1 Filter Sample, Received 10/17/88.

Water samples were analyzed for requested metals using inductively coupled argon plasma spectroscopy or atomic absorption spectroscopy following methods for chemical analysis of water and wastes. The EPA method employed is listed alongside of the parameter. Samples were digested according to EPA protocol prior to analysis. The results are presented in Table 1.

The filter sample was analyzed for requested metals using Inductively Coupled Argon Plasma Spectroscopy or atomic absorption spectrometry following Test Methods for Evaluating Solid Waste. The EPA method employed is listed alongside of the parameter. Samples were prepared using EPA method 3050 by digesting the sample in acid prior to analysis. The results are presented in Table 2.

If you should have any technical questions, please contact Robert DeRosier at (415)961-5700.

Submitted by:
Maryann Gambino
Supervisor, Inorganic Chemistry

Approved by:
Robert DeRosier
Client Services Manager

Approved by: David R. Taylor
David R. Taylor, Ph.D.
Quality Assurance Manager

These results were obtained by following standard laboratory procedures; the liability of Acurex Corporation shall not exceed the amount paid for this report. In no event shall Acurex be liable for special or consequential damages.

Table 1. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	B0929 0907 mg/L	B0929 1007 mg/L	B0929 1107 mg/L	B0929 1158 mg/L	F0929 0929 mg/L
Chromium	200.7	0.11	0.19	0.37	0.44	3000

Sample volume (mL):	146	138	144	154	128
Volume used (mL):	100	100	100	100	50
Dilution factor:	1	1	1	1	2

NOTE: Dilution factors are already incorporated in above data

Table 1. Metals Results

		Acurex-CRF Sample ID				
		E0929 0920 M5T1(I-1)	E0929 0920 M5T1(I-2)	E0929 0920 M5T1(I-3)	A0929 0907 M5T1PW	A0929 0907 M5T1(I-1)
Parameter	EPA Method	mg/L	mg/L	mg/L	mg/L	mg/L
Chromium	200.7	0.025	0.013	0.023	<0.1	0.061
Sample volume (mL):		910	410	400	34	134
Volume used (mL):		100	100	100	10	100
Dilution factor:		1	1	1	10	1

NOTE: Dilution factors are already incorporated in above data

Table 1. Metals Results

		Acurex-CRF Sample ID				
		A0929 0907 M5T1(I-2)	A0929 0907 M5T1(I-3)	A0929 0907 M5T1PW	Spike	Dup Spike
Parameter	EPA Method	mg/L	mg/L	mg/L	% Recov	RPD
Chromium	200.7	0.1	0.095	<0.5	105	1.9
Sample volume (mL):		126	100	10	910	910
Volume used (mL):		50	50	2	100	100
Dilution factor:		2	2	50	1	1

NOTE: Dilution factors are already incorporated in above data

Table 1. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	Method Blank mg/L	Method Detection Limit mg/L
Chromium	200.7	<0.01	0.01

Sample volume (mL):	100
Volume used (mL):	100
Dilution factor:	1

NOTE: Dilution factors are already incorporated in above data

Table 2. Metals Results

		Acurex-CRF Sample ID				
		E0929 0920 M5T1F	Spike	Dup Spike	Method Blank	Method Detection Limit
Parameter	EPA Method	mg/filt	% Recov	RPD	mg/L	mg/filt
Chromium	6010	0.045	89	0.87	<0.01	0.1

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Environmental Systems Division

Acurex - CRF

December 15, 1988
Acurex ID: 8810058
Client PO: 8327
Page 1 of 2

Attention: Larry Waterland

Subject: Analysis of 1 Soil Sample, Received 10/17/88.

This sample was received as a replacement for the one on traveller 8810013 that arrived broken.

Soil samples were analyzed for requested metals using Inductively Coupled Argon Plasma Spectroscopy or atomic absorption spectrometry following Test Methods for Evaluating Solid Waste. The EPA method employed is listed alongside of the parameter. Samples were prepared using EPA method 3050 by digesting the sample in acid prior to analysis. The results are presented in Table 1.

If you should have any technical questions, please contact Robert DeRosier at (415)961-5700.

Submitted by:
Maryann Gambino
Supervisor, Inorganic Chemistry

Approved by:
Robert DeRosier
Client Services Manager

Approved by: David R Taylor
David R. Taylor, Ph.D.
Quality Assurance Manager

These results were obtained by following standard laboratory procedures; the liability of Acurex Corporation shall not exceed the amount paid for this report. In no event shall Acurex be liable for special or consequential damages.

Table 1. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	T0830 1450	Spike	Dup Spike	Method Blank	Method Detection Limit
		mg/kg	% Recov	RPD	mg/L	mg/kg
Arsenic	7060	16	124	18	<0.01	1
Barium	6010	42	111	6.9	<0.01	1
Bismuth		23	91	3.6	<0.1	10
Cadmium	6010	<1	98	9.1	<0.01	1
Chromium	6010	79	115	11	<0.01	1
Copper	6010	220	91	18	<0.01	1
Lead	7420	7	117	11	<0.001	0.1
Magnesium	6010	28000	100	3.4	<0.05	5
Strontium		160	104	20	<0.01	1

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Environmental Systems Division

Acurex-CRF

December 15, 1988
Acurex ID: 8810079
Client PO: 8327
Page 1 of 5

Attention: Larry Waterland

Subject: Analysis of 2 Soil and 3 Filter Samples, Received 10/27/88.

Soil samples were analyzed for requested metals using Inductively Coupled Argon Plasma Spectroscopy or atomic absorption spectrometry following Test Methods for Evaluating Solid Waste. The EPA method employed is listed alongside of the parameter. Samples were prepared using EPA method 3050 by digesting the sample in acid prior to analysis. The results are presented in Table 1.

The filter samples were analyzed for requested metals using Inductively Coupled Argon Plasma Spectroscopy or atomic absorption spectrometry following Test Methods for Evaluating Solid Waste. The EPA method employed is listed alongside of the parameter. Samples were prepared using EPA method 3050 by digesting the sample in acid prior to analysis. The results are presented in Table 2.

If you should have any technical questions, please contact Robert DeRosier at (415)961-5700.

Submitted by: Maryann Gambino
Supervisor, Inorganic Chemistry

Approved by: Robert DeRosier
Client Services Manager

Approved by: David R. Taylor
David R. Taylor, Ph.D.
Quality Assurance Manager

These results were obtained by following standard laboratory procedures; the liability of Acurex Corporation shall not exceed the amount paid for this report. In no event shall Acurex be liable for special or consequential damages.

485 Clyde Avenue, P.O. Box 7044, Mountain View, CA 94039 (415) 961-5700 Telex 325961 FAX (415) 964-5145

Table 1. Metals Results

Acurex-CRF Sample ID

		A0825 1200 M17	A0920 1014 THETA	Spike	Dup Spike	Method Blank
Parameter	EPA Method	mg/kg	mg/kg	% Recov	RPD	mg/L
Arsenic	7060	26	330	109	25	<0.01
Barium	6010	28	<10	107	2.7	<0.01
Bismuth		520	300	112	10	<0.1
Cadmium	6010	73	700	108	5.5	<0.01
Chromium	6010	42000	720	102	29	<0.01
Copper	6010	410	5100	132	22	<0.01
Lead	7421	270	880	125	4.1	0.0014
Magnesium	6010	2200	3000	106	3.2	<0.05
Strontium		<10	20	108	3.7	<0.01

Table 1. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	Method Detection Limit mg/kg
Arsenic	7060	1
Barium	6010	1
Bismuth		10
Cadmium	6010	1
Chromium	6010	1
Copper	6010	1
Lead	7421	1
Magnesium	6010	5
Strontium		1

Table 2. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	A0926 1039 M5F	A0928 0931 M5F	A0929 0907 M5F	Spike	Dup Spike
		mg/filt	mg/filt	mg/filt	% Recov	% RPD
Chromium	6010	0.047	0.039	0.01	89	0.87

Table 2. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	Method Blank mg/L	Method Detection Limit mg/filt
Chromium	6010	0.022	0.001

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Environmental Systems Division

Acurex - CRF

December 15, 1988
Acurex ID: 8811023
Client PO: 8327
Page 1 of 4

Attention: Larry Waterland

Subject: Analysis of 11 Soil Samples, Received 11/4/88.

Soil samples were analyzed for requested metals using Inductively Coupled Argon Plasma Spectroscopy or atomic absorption spectrometry following Test Methods for Evaluating Solid Waste. The EPA method employed is listed alongside of the parameter. Samples were prepared using EPA method 3050 by digesting the sample in acid prior to analysis. The results are presented in Table 1.

If you should have any technical questions, please contact Robert DeRosier at (415)961-5700.

Submitted by: ______________
Maryann Gambino
Supervisor, Inorganic Chemistry

Approved by: ______________
Robert DeRosier
Client Services Manager

Approved by: David R. Taylor
David R. Taylor, Ph.D.
Quality Assurance Manager

These results were obtained by following standard laboratory procedures; the liability of Acurex Corporation shall not exceed the amount paid for this report. In no event shall Acurex be liable for special or consequential damages.

485 Clyde Avenue, P.O. Box 7044, Mountain View, CA 94039 (415) 961-5700 Telex 325961 FAX (415) 964-5145

Table 1. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	F1103 0924 mg/kg	F1103 0927 mg/kg	F1103 0929 mg/kg	F1103 0932 mg/kg	F1103 0933 mg/kg
Bismuth		12	NA	NA	NA	NA
Chromium	6010	55	51	53	54	55
Lead	7421	3.7	2.8	2.9	3.1	2.3
Magnesium	6010	23000	21000	22000	22000	22000
Strontium		37	34	32	33	30

NA - Not analyzed

Table 1. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	F1103 0934 mg/kg	F1103 0937 mg/kg	F1103 0939 mg/kg	F1103 0941 mg/kg	F1103 0943 mg/kg
Bismuth		NA	NA	NA	NA	NA
Chromium	6010	55	54	50	50	52
Lead	7421	3.2	3.5	3.0	2.5	NA
Magnesium	6010	23000	22000	20000	22000	NA
Strontium		33	36	33	35	NA

NA - Not analyzed

Table 1. Metals Results

Acurex-CRF Sample ID

Parameter	EPA Method	F1103 0945 mg/kg	Spike % Recov	Dup Spike RPD	Method Blank mg/L	Method Detection Limit mg/kg
Bismuth		NA	86	12	<0.1	10
Chromium	6010	54	94	2	<0.01	1
Lead	7421	NA	118	3.4	0.0032	0.1
Magnesium	6010	NA	102	0.042	<0.05	5
Strontium		NA	105	2.8	<0.01	1

NA - Not analyzed

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Environmental Systems Division

Acurex - CRF

December 20, 1988
Acurex ID: 8812009
Client PO: 8327
Page 1 of 4

Attention: Larry Waterland

Subject: Analysis of 1 Solid Sample, Received 12/2/88.

Water samples were analyzed for requested metals using inductively coupled argon plasma spectroscopy or atomic absorption spectroscopy following methods for chemical analysis of water and wastes. The EPA method employed is listed alongside of the parameter. Samples were digested according to EPA protocol prior to analysis. The results are presented in Table 1.

If you should have any technical questions, please contact Robert DeRosier at (415)961-5700.

Submitted by: Maryann Gambino
Supervisor, Inorganic Chemistry

Approved by: Robert DeRosier
Client Services Manager

Approved by: David R. Taylor
David R. Taylor, Ph.D.
Quality Assurance Manager

These results were obtained by following standard laboratory procedures; the liability of Acurex Corporation shall not exceed the amount paid for this report. In no event shall Acurex be liable for special or consequential damages.

Table 1. Metals Results

		Acurex CRF Sample ID				
		Q1130 01250 FBK	STANDARD CRO3 @0.2 PPM	8806 096-2 RE-RUN	Q0929 0830 FSK	Q0929 0831 FSK
Parameter	EPA Method	mg/L	mg/L	mg/L	mg/L	mg/L
Chromium (hex.)	218.4	0.57	0.22	0.89	2.7	3.1
Sample Volume (mL):		400	--	--	400	400
Volume used (mL):		50	--	100	20	20
Dilution factor:		2	1	1	5	5
Sample weight (g):		100	--	--	100	100

NOTE: Dilution factors are already incorporated in above data.

Table 1. Metals Results

Acurex CRF Sample ID

Parameter	EPA Method	Q0929 1030 BSK mg/L	F0929 0908 mg/L	Q0929 1400 TSK mg/L	Spike % Spike	Dup Spike RPD
Chromium (hex.)	218.4	0.49	3100	2.3	75	7.3

Sample Volume (mL):	50	115	400	400	400
Volume used (mL):	25	--	20	50	50
Dilution factor:	4	5000	5	2	2
Sample weight (g):	--	--	100	100	100

NOTE: Dilution factors are already incorporated in above data.

Table 1. Metals Results

Parameter	EPA Method	Acurex CRF Sample ID Method Blank mg/L	 2nd CR+6 STANDARD @0.2 PPM mg/L	 Method Detection Limit mg/L
Chromium (hex.)	218.4	<0.003	0.2	0.003

Sample Volume (mL): 100

Volume used (mL): 100

Dilution factor: 1

Sample weight (g): --

NOTE: Dilution factors are already incorporated in above date.

6

ACUREX
Corporation

Environmental Systems Division

Acurex - CRF

January 26, 1989
Acurex ID: 8812065
Client PO: 8327
Page 1 of 7

Attention: Larry Waterland

Subject: Analysis of 24 Trace Metal Samples, Received 12/13/88.

Samples were analyzed for requested metals using Inductively Coupled Argon Plasma Spectroscopy or atomic absorption spectrometry following Test Methods for Evaluating Solid Waste. The EPA method employed is listed alongside of the parameter. Samples were prepared using EPA method 3050 by digesting the sample in acid prior to analysis. The results are presented in Table 1.

If you should have any technical questions, please contact Robert DeRosier at (415)961-5700.

Submitted by: ______________________
Maryann Gambino
Supervisor, Inorganic Chemistry

Approved by: ______________________
Robert DeRosier
Client Services Manager

Approved by: David R. Taylor
David R. Taylor, Ph.D.
Quality Assurance Manager

These results were obtained by following standard laboratory procedures; the liability of Acurex Corporation shall not exceed the amount paid for this report. In no event shall Acurex be liable for special or consequential damages.

Table 1. Metals Results

		Acurex-CRF Sample ID				
		A0830 1114 1-18F	A0830 1114 1-17F	A0830 1114 1-16F	A0830 1114 1-14F,etc	A0907 1129 2-18F
Parameter	EPA Method	mg	mg	mg	mg	mg
Arsenic	7060	0.0013	0.011	0.027	0.044	<0.001
Barium	6010	<0.001	0.0014	0.0022	0.0046	<0.001
Bismuth		0.038	<0.01	<0.01	0.024	<0.01
Cadmium	6010	0.0017	0.016	0.035	0.068	<0.001
Chromium	6010	0.0099	0.069	0.18	0.31	0.002
Copper	6010	0.03	0.19	0.39	0.86	0.0075
Lead	7421	0.0025	0.017	0.035	0.075	0.001
Magnesium	6010	0.081	0.34	0.79	1.4	0.012
Strontium		<0.001	<0.001	0.003	0.006	<0.001
Sample Used (g):		All	All	All	All	All

Table 1. Metals Results

		Acurex-CRF Sample ID				
		A0907 1129 2-17F	A0907 1129 2-16F	A0907 1129 2-14F,etc	A0909 1122 3-18F	A0909 1122 3-17F
Parameter	EPA Method	mg	mg	mg	mg	mg
Arsenic	7060	0.0013	0.038	0.024	0.0021	0.051
Barium	6010	<0.001	0.0028	0.0027	0.02	0.0047
Bismuth		0.024	<0.01	<0.01	<0.01	0.032
Cadmium	6010	0.0037	0.079	0.05	0.0056	0.16
Chromium	6010	0.012	0.24	0.18	0.0074	0.089
Copper	6010	0.042	0.94	0.77	0.093	1.4
Lead	7421	0.0071	0.21	0.12	0.018	0.57
Magnesium	6010	0.056	1.2	0.89	0.24	2.5
Strontium		<0.001	0.003	0.003	<0.001	0.005
Sample Used (g):		All	All	All	All	All

Table 1. Metals Results

Acurex-CRB Sample ID

Parameter	EPA Method	A0909 1122 3-16F	A0909 1122 3-14F,etc	A0914 0928 4-18F	A0914 0928 4-17F	A0914 0928 4-16F
		mg	mg	mg	mg	mg
Arsenic	7060	0.033	0.021	<0.001	<0.001	0.0092
Barium	6010	0.0033	0.0061	<0.001	<0.001	0.0013
Bismuth		0.016	0.055	<0.01	<0.01	0.23
Cadmium	6010	0.11	0.055	<0.001	<0.001	0.022
Chromium	6010	0.052	0.073	<0.001	<0.001	0.02
Copper	6010	0.9	0.63	0.0062	0.0048	0.057
Lead	7421	0.3	0.16	0.0002	0.0008	0.021
Magnesium	6010	2.0	4.4	<0.005	0.014	0.36
Strontium		0.003	0.015	<0.001	<0.001	<0.001
Sample Used (g):		0.1	All	All	All	All

Table 1. Metals Results

Acurex-CRF Sample 1J

Parameter	EPA Method	A0914 0928 4-14F,etc	A0916 1110 5-18F	A0916 1110 5-17F	A0916 1110 5-16F	A0916 1110 5-14F,etc
		mg	mg	mg	mg	mg
Arsenic	7060	0.0087	0.0011	0.024	0.17	0.076
Barium	6010	0.0016	<0.001	0.0016	0.0053	0.0084
Bismuth		0.21	<0.01	0.022	0.1	0.3
Cadmium	6010	0.019	0.0022	0.052	0.37	0.18
Chromium	6010	0.084	0.005	0.044	0.18	0.5
Copper	6010	0.15	0.025	0.42	2.8	1.6
Lead	7421	0.025	0.005	0.13	0.87	0.42
Magnesium	6010	0.49	0.058	0.42	2.5	3.7
Strontium		<0.001	<0.001	<0.001	0.008	0.017
Sample Used (g):		All	All	All	All	All

Table 1. Metals Results

		Acurex-CRF Sample ID				
		A0922 0942 6-18F	A0922 0942 6-17F	A0922 0942 6-16F	A0922 0942 6-14F,etc	Spike
Parameter	EPA Method	mg	mg	mg	mg	% Recov
Arsenic	7060	<0.001	0.01	0.063	0.03	105
Barium	6010	<0.001	0.0011	0.0034	0.0038	100
Bismuth		<0.01	0.02	0.046	0.09	92
Cadmium	6010	0.0032	0.042	0.21	0.081	110
Chromium	6010	0.0045	0.035	0.16	0.31	105
Copper	6010	0.052	0.6	3.3	1.2	92
Lead	7421	0.014	0.22	1.1	0.37	108
Magnesium	6010	0.054	0.29	1.4	1.1	81
Strontium		<0.001	<0.001	0.003	0.004	97
Sample Used (g):		All	All	All	All	0.1

Table 1. Metals Results

		Acurex-CRF Sample ID		
		Spike	Method Blank	Method Detection Limit
Parameter	EPA Method	RPD	mg/L	mg/kg
Arsenic	7060	5.6	<0.01	1
Barium	6010	3.7	<0.01	1
Bismuth		22	<0.1	10
Cadmium	6010	3.9	<0.01	1
Chromium	6010	6.0	<0.01	1
Copper	6010	4.1	<0.01	1
Lead	7421	3.5	<0.001	0.1
Magnesium	6010	9.7	<0.05	5
Strontium		3.0	<0.01	1
Sample Used (g):		0.1	--	

ACUREX Corporation

Environmental Systems Division

Acurex - CRF

January 26, 1989
Acurex ID: 8901023
Client PO: 8327
Page 1 of 2

Attention: Larry Waterland

Subject: Analysis of 1 Soil Sample, Received 1/11/89.

The soil sample was analyzed for requested metals using Inductively Coupled Argon Plasma Spectroscopy or atomic absorption spectrometry following Test Methods for Evaluating Solid Waste. The EPA method employed is listed alongside of the parameter. Samples were prepared using EPA method 3050 by digesting the sample in acid prior to analysis. The results are presented in Table 1.

If you should have any technical questions, please contact Robert DeRosier at (415)961-5700.

Submitted by: Maryann Gambino
Supervisor, Inorganic Chemistry

Approved by: Robert DeRosier
Client Services Manager

Approved by: David R Taylor
David R. Taylor, Ph.D.
Quality Assurance Manager

These results were obtained by following standard laboratory procedures; the liability of Acurex Corporation shall not exceed the amount paid for this report. In no event shall Acurex be liable for special or consequential damages.

Table 1. Metals Results

		Acurex-CRF Sample ID				
		T0916 1625 (RV 43)	Spike	Dup Spike	Method Blank	Method Detection Limit
Parameter	EPA Method	mg/kg	% Recov	RPD	mg/L	mg/kg
Arsenic	7060	17	117	19	<0.01	1
Barium	6010	47	80	2.1	<0.01	1
Bismuth		16	101	27	<0.1	10
Cadmium	6010	<1	93	0.32	<0.01	1
Chromium	6010	85	90	3.1	<0.01	1
Copper	6010	280	72	1.3	0.026	1
Lead	7420	3.8	104	1.6	<0.001	0.1
Magnesium	6010	28000	84	7.3	<0.05	5
Strontium		170	72	4.3	<0.01	1
Sample Used (g):		1.0	1.0	1.0	--	

USEPA COMBUSTION RESEARCH FACILITY
ANALYTICAL LABORATORY
PURGE AND TRAP ANALYSIS
TRACE METALS FEED SAMPLES

COMPOUND	PQL (ppm)	F08191231 UG/G	F08191238 UG/G	F08241552 UG/G	F08241555 UG/G	F08300840 UG/G	F08300850 UG/G	F08300900 UG/G
1,1-DICHLOROETHENE	10900							
METHYLENE CHLORIDE	9690							
t-1,2-DICHLOROETHENE	10400							
HEXANE	9990							
1,1-DICHLOROETHANE	9590							
CHLOROFORM	10600							
1,1,1-TRICHLOROETHANE	9990							
CARBON TETRACHLORIDE	9990							
BENZENE	10900							
1,2-DICHLOROETHANE	9990							
TRICHLOROETHENE	11200							
1,2-DICHLOROPROPANE	10100							
BROMODICHLOROMETHANE	9690							
t-1,3-DICHLOROPROPENE	9660							
TOLUENE	9990	151000	254200	151200	157000	160000	191700	197500
OCTANE	8299							
c-1,3-DICHLOROPROPENE	9670							
1,1,2-TRICHLOROETHANE	11300							
TETRACHLOROETHENE	10600	21900	38900	27100	22000	22300	28800	27200
CHLOROBENZENE	10600	22500	41200	22400	29600	25000	29700	29500
ETHYLBENZENE	10100							
BROMOFORM	11600							
4-BROMOFLUOROBENZENE	9990							
TETRACHLOROETHANE	11700							
1,3-DICHLOROBENZENE	10500							
1,4-DICHLOROBENZENE	10300							
1,2-DICHLOROBENZENE	9990							
NONANE	8599							
DECANE	11000							
Date Analyzed:		09-13-88	09-13-88	09-13-88	09-13-88	09-13-88	09-13-88	09-13-88
TET (days):		25	25	20	20	14	14	14

No reported values indicate levels below PQL.

Spike Levels for MBK:

TOLUENE 200.000 UG/G
TETRACHLOROETHYLENE 35,000 UG/G
CHLOROBENZENE 35,000 UG/G

USEPA COMBUSTION RESEARCH FACILITY
ANALYTICAL LABORATORY
PURGE AND TRAP ANALYSIS
TRACE METALS FEED SAMPLES

COMPOUND	PQL (ppm)	F08311600 UG/G	F08311615 UG/G	F09090830 UG/G	F09130830 UG/G	F09130845 UG/G	F09130930 UG/G	F09160830 UG/G
1,1-DICHLOROETHENE	10900							
METHYLENE CHLORIDE	9690							
t-1,2-DICHLOROETHENE	10400							
HEXANE	9990							
1,1-DICHLOROETHANE	9590							
CHLOROFORM	10600							
1,1,1-TRICHLOROETHANE	9990							
CARBON TETRACHLORIDE	9990							
BENZENE	10900							
1,2-DICHLOROETHANE	9990							
TRICHLOROETHENE	11200							
1,2-DICHLOROPROPANE	10100							
BROMODICHLOROMETHANE	9690							
t-1,3-DICHLOROPROPENE	9660							
TOLUENE	9990	162800	154000	152000	224500	155000	265800	190500
OCTANE	8299							
c-1,3-DICHLOROPROPENE	9670							
1,1,2-TRICHLOROETHANE	11300							
TETRACHLOROETHENE	10600	28300	23300	24000				30900
CHLOROBENZENE	10600	27000	24800	25000				29600
ETHYLBENZENE	10100							
BROMOFORM	11600							
4-BROMOFLUOROBENZENE	9990							
TETRACHLOROETHANE	11700							
1,3-DICHLOROBENZENE	10500							
1,4-DICHLOROBENZENE	10300							
1,2-DICHLOROBENZENE	9990							
NONANE	8599							
DECANE	11000							
Date Analyzed:		09-13-88	09-13-88	09-13-88	09-13-88	09-13-88	09-13-88	09-23-88
TET (days):		13	13	4	0	0	0	7

No reported values indicate levels below PQL

Spike Levels for MBK:

TOLUENE 200,000 UG/G
TETRACHLOROETHYLENE 35,000 UG/G
CHLOROBENZENE 35,000 UG/G

USEPA COMBUSTION RESEARCH FACILITY
ANALYTICAL LABORATORY
PURGE AND TRAP ANALYSIS
TRACE METALS FEED SAMPLES

COMPOUND	PQL (ppm)	F09160840 UG/G	F09160850 UG/G	F09200830 UG/G	F09200840 UG/G	F09200850 UG/G	F09211435 UG/G	F09211440 UG/G
1,1-DICHLOROETHENE	10900							
METHYLENE CHLORIDE	9690							
t-1,2-DICHLOROETHENE	10400							
HEXANE	9990							
1,1-DICHLOROETHANE	9590							
CHLOROFORM	10600							
1,1,1-TRICHLOROETHANE	9990							
CARBON TETRACHLORIDE	9990							
BENZENE	10900							
1,2-DICHLOROETHANE	9990							
TRICHLOROETHENE	11200							
1,2-DICHLOROPROPANE	10100							
BROMODICHLOROMETHANE	9690							
t-1,3-DICHLOROPROPENE	9660							
TOLUENE	9990	190400	189200	210800	200700	211900	127900	139600
OCTANE	8299							
c-1,3-DICHLOROPROPENE	9670							
1,1,2-TRICHLOROETHANE	11300							
TETRACHLOROETHENE	10600	28900	30500	32400	9240	31900	56000	61200
CHLOROBENZENE	10600	29200	31700	33800	46100	30600	56900	62100
ETHYLBENZENE	10100							
BROMOFORM	11600							
4-BROMOFLUOROBENZENE	9990							
TETRACHLOROETHANE	11700							
1,3-DICHLOROBENZENE	10500							
1,4-DICHLOROBENZENE	10300							
1,2-DICHLOROBENZENE	9990							
NONANE	8599							
DECANE	11000							
Date Analyzed:		09-23-88	09-23-88	09-23-88	09-23-88	09-23-88	09-23-88	09-23-88
TET (days):		7	7	3	3	3	2	2

No reported values indicate levels below PQL

Spike Levels for MBK:

TOLUENE 200,000 UG/G
TETRACHLOROETHYLENE 35,000 UG/G
CHLOROBENZENE 35,000 UG/G

USEPA COMBUSTION RESEARCH FACILITY
ANALYTICAL LABORATORY
PURGE AND TRAP ANALYSIS
TRACE METALS FEED SAMPLES

COMPOUND	PQL (ppm)	F09211445 UG/G	F09231410 UG/G	F09231420 UG/G	DUPLICATE F09231420 UG/G	F09271515 UG/G	F09271520 UG/G	F09271525 UG/G
1,1-DICHLOROETHENE	10900							
METHYLENE CHLORIDE	9690							
t-1,2-DICHLOROETHENE	10400							
HEXANE	9990							
1,1-DICHLOROETHANE	9590							
CHLOROFORM	10600							
1,1,1-TRICHLOROETHANE	9990							
CARBON TETRACHLORIDE	9990							
BENZENE	10900							
1,2-DICHLOROETHANE	9990							
TRICHLOROETHENE	11200							
1,2-DICHLOROPROPANE	10100							
BROMODICHLOROMETHANE	9690							
t-1,3-DICHLOROPROPENE	9660							
TOLUENE	9990	136400	137500	152600	150600	264200	254900	244100
OCTANE	8299							
c-1,3-DICHLOROPROPENE	9670							
1,1,2-TRICHLOROETHANE	11300							
TETRACHLOROETHENE	10600	59600	59800	64000	62800			
CHLOROBENZENE	10600	60200	53900	59600	58000			
ETHYLBENZENE	10100							
BROMOFORM	11600							
4-BROMOFLUOROBENZENE	9990							
TETRACHLOROETHANE	11700							
1,3-DICHLOROBENZENE	10500							
1,4-DICHLOROBENZENE	10300							
1,2-DICHLOROBENZENE	9990							
NONANE	8599							
DECANE	11000							
Date Analyzed:		09-23-88	09-28-88	09-28-88	09-28-88	09-28-88	09-28-88	09-28-88
TET (days):		2	5	5	5	1	1	1

No reported values indicate levels below PQL

Spike Levels for MBK:

TOLUENE 200,000 UG/G
TETRACHLOROETHYLENE 35,000 UG/G
CHLOROBENZENE 35,000 UG/G

USEPA COMBUSTION RESEARCH FACILITY
ANALYTICAL LABORATORY
PURGE AND TRAP ANALYSIS
TRACE METALS FEED SAMPLES

COMPOUND	PQL (ppm)	DUPLICATE F09271525 UG/G	G09221610MSK UG/G	G09221615MSK UG/G	G09221620MSK UG/G	G09281300VBK UG/G
1,1-DICHLOROETHENE	10900					
METHYLENE CHLORIDE	9690					
t-1,2-DICHLOROETHENE	10400					
HEXANE	9990					
1,1-DICHLOROETHANE	9590					
CHLOROFORM	10600					
1,1,1-TRICHLOROETHANE	9990					
CARBON TETRACHLORIDE	9990					
BENZENE	10900					
1,2-DICHLOROETHANE	9990					
TRICHLOROETHENE	11200					
1,2-DICHLOROPROPANE	10100					
BROMODICHLOROMETHANE	9690					
t-1,3-DICHLOROPROPENE	9660					
TOLUENE	9990	269700	171600	175000	207900	
OCTANE	8299					
c-1,3-DICHLOROPROPENE	9670					
1,1,2-TRICHLOROETHANE	11300					
TETRACHLOROETHENE	10600		26400	27500	33200	
CHLOROBENZENE	10600		27200	28300	34900	
ETHYLBENZENE	10100					
BROMOFORM	11600					
4-BROMOFLUOROBENZENE	9990					
TETRACHLOROETHANE	11700					
1,3-DICHLOROBENZENE	10500					
1,4-DICHLOROBENZENE	10300					
1,2-DICHLOROBENZENE	9990					
NONANE	8599					
DECANE	11000					
Date Analyzed:		09-28-88	09-23-88	09-23-88	09-23-88	09-28-88
TET (days):		1	1	1	1	0

No reported values indicate levels below PQL

Spike Levels for MSK:

TOLUENE 200,000 UG/G
TETRACHLOROETHYLENE 35,000 UG/G
CHLOROBENZENE 35,000 UG/G

USEPA COMBUSTION RESEARCH FACILITY
ANALYTICAL LABORATORY
DATE: 08-25-88

COMPOUND	PQL ug/dscm	ug/dscm A08251331V	ug/dscm A08251440V	ug/dscm A08251515V	ug/dscm E08251334V	ug/dscm E08251424V	ug/dscm E08251517V
1,1-DICHLOROETHENE M .294	1.64	0.00	0.00	0.00	0.00	0.00	0.00
METHYLENE CHLORIDE	1.46	0.00	0.00	0.00	0.00	0.00	0.00
t-1,2-DICHLOROETHENE	1.56	0.00	0.00	0.00	0.00	0.00	0.00
HEXANE	1.50	0.00	0.00	0.00	0.00	0.00	0.00
1,1-DICHLOROETHANE	1.44	0.00	0.00	0.00	0.00	0.00	0.00
CHLOROFORM	1.59	10.93	10.41	6.01	12.40	8.82	8.72
1,1,1-TRICHLOROETHANE M .312	1.50	0.00	0.00	0.00	0.00	0.00	0.00
CARBON TETRACHLORIDE	1.50	11.97	7.84	5.42	3.73	0.00	2.08
BENZENE M .240	1.64	2.66	3.79	0.00	16.62	5.10	3.67
1,2-DICHLOROETHANE	1.50	0.00	0.00	0.00	0.00	0.00	0.00
TRICHLOROETHENE	1.60	0.00	1.73	0.00	0.00	0.00	0.00
1,2-DICHLOROPROPANE	1.52	0.00	0.00	0.00	0.00	0.00	0.00
BROMODICHLOROMETHANE	1.46	0.00	0.00	0.00	8.94	0.00	6.60
t-1,3-DICHLOROPROPENE	1.45	0.00	0.00	0.00	0.00	0.00	0.00
TOLUENE M .242	1.50	19.64	9.67	0.00	104.44	9.11	5.03
OCTANE * .246	1.24	137%	151%	117%	217%	112%	153%
c-1,3-DICHLOROPROPENE	1.45	0.00	0.00	0.00	0.00	0.00	0.00
1,1,2-TRICHLOROETHANE	1.70	0.00	0.00	0.00	0.00	0.00	0.00
TETRACHLOROETHENE M .228	1.59	8.56	12.24	0.00	13.56	0.00	0.00
DIBROMOCHLOROMETHANE	1.50	3.71	5.13	0.00	30.20	7.01	6.06
CHLOROBENZENE M .285	1.59	3.23	0.00	0.00	6.83	0.00	0.00
ETHYLBENZENE	1.52	0.00	0.00	0.00	15.82	0.00	0.00
BROMOFORM	1.74	0.00	0.00	0.00	7.08	4.69	1.89
4-BROMOFLUOROBENZENE * .300	1.50	105%	115%	101%	91%	105%	112%
TETRACHLOROETHANE	1.76	0.00	0.00	0.00	0.00	0.00	0.00
1,3-DICHLOROBENZENE	1.58	2.94	0.00	0.00	1.82	0.00	0.00
1,4-DICHLOROBENZENE	1.55	2.92	0.00	1.72	1.57	0.00	0.00
1,2-DICHLOROBENZENE	1.50	0.00	0.00	0.00	0.00	0.00	0.00
NONANE (IS)	12.90	0%	155%	107%	0%	93%	177%
DECANE (IS)	16.50	0%	265%	144%	0%	144%	366%

OTHER COMPOUNDS						
m&p-XYLENES	0.37	0.69	0.28	18.28	0.30	0.29
o-XYLENE + STYRENE	0.56	0.30	0.30	5.57	0.53	0.41
BENZALDEHYDE	0.24	0.40	0.40	1.69	0.42	0.41
OCTANAL	0.41	0.35	0.19	4.50	0.85	0.55

* Surrogates shown in % recovery
M Matrix spike shown in % recovery
IS Internal standards shown in % recovery
@ Indicates levels above calibrated range
PQL (Practical Quantitation Limit)

USEPA COMBUSTION RESEARCH FACILITY
ANALYTICAL LABORATORY
DATE: 10-25-88

COMPOUND	PQL ug/dscm	ug/dscm Q08251517VFBK	ug/dscm Q08251700VLBK	ug/dscm Q08251515VFBK	ug/dscm Q08251440VFBK
1,1-DICHLOROETHENE M .294	1.64				
METHYLENE CHLORIDE	1.46				
t-1,2-DICHLOROETHENE	1.56				
HEXANE	1.50				
1,1-DICHLOROETHANE	1.44				
CHLOROFORM	1.59				
1,1,1-TRICHLOROETHANE M .312	1.50				93%
CARBON TETRACHLORIDE	1.58				
BENZENE M .240	1.64	1.60			116%
1,2-DICHLOROETHANE	1.50				
TRICHLOROETHENE	1.60				
1,2-DICHLOROPROPANE	1.52				
BROMODICHLOROMETHANE	1.46				
t-1,3-DICHLOROPROPENE	1.45				
TOLUENE M .243	1.50				104%
OCTANE # .246	1.24	56%	72%	94%	98%
c-1,3-DICHLOROPROPENE	1.45				
1,1,2-TRICHLOROETHANE	1.70				
TETRACHLOROETHENE M .228	1.59				102%
DIBROMOCHLOROMETHANE	1.50			1.55	
CHLOROBENZENE M .205	1.59				96%
ETHYLBENZENE	1.52				
BROMOFORM	1.74				
4-BROMOFLUOROBENZENE # .260	1.56	27%	92%	94%	97%
TETRACHLOROETHANE	1.76				
1,3-DICHLOROBENZENE	1.58				
1,4-DICHLOROBENZENE	1.55				
1,2-DICHLOROBENZENE	1.50				
NONANE (IS)	12.90	29%	65%	76%	94%
DECANE (IS)	16.50	42%	78%	95%	125%

OTHER COMPOUNDS			
m&p-XYLENES	0.09	0.09	0.14
o-XYLENE + STYRENE	0.10	0.03	0.05
BENZALDEHYDE	0.33	0.74	0.09
OCTANAL	0.06	0.13	0.05

Surrogates shown in % recovery
M Matrix spike shown in % recovery
IS Internal standards shown in % recovery
@ indicates levels above calibrated range
PQL (Practical Quantitation Limit)

USEPA COMBUSTION RESEARCH FACILITY
ANALYTICAL LABORATORY
DATE: 08-30-88

COMPOUND	PQL ug/dscm	ug/dscm A08301303V	u ug/dscm A08301342V	ug/dscm A08301421V	ug/dscm E08301303V	ug/dscm E08301348V	ug/dscm E08301423V
1,1-DICHLOROETHENE M .294	1.64	0.00	0.00	0.00	0.00	0.00	0.00
METHYLENE CHLORIDE	1.46	0.00	0.00	0.00	0.00	0.00	0.00
t-1,2-DICHLOROETHENE	1.56	0.00	0.00	0.00	0.00	0.00	0.00
HEXANE	1.50	0.00	0.00	0.00	0.00	0.00	0.00
1,1-DICHLOROETHANE	1.44	0.00	0.00	0.00	0.00	0.00	0.00
CHLOROFORM	1.59	13.66	4.79	19.46	6.30	1.75	1.86
1,1,1-TRICHLOROETHANE M .312	1.50	0.00	0.00	0.00	0.00	0.00	0.00
CARBON TETRACHLORIDE	1.50	6.01	1.80	0.00	0.00	2.57	0.00
BENZENE M .240	1.64	3.34	0.00	0.00	0.00	0.00	0.00
1,2-DICHLOROETHANE	1.50	0.00	0.00	0.00	0.00	3.28	0.00
TRICHLOROETHENE	1.68	0.00	0.00	0.00	0.00	0.00	0.00
1,2-DICHLOROPROPANE	1.52	0.00	0.00	0.00	0.00	0.00	0.00
BROMODICHLOROMETHANE	1.46	2.01	1.57	0.00	5.19	2.96	0.00
t-1,3-DICHLOROPROPENE	1.45	0.00	0.00	0.00	0.00	0.00	0.00
TOLUENE M .243	1.50	390.42 @	12.70	8.64	40.19	16.64	5.67
OCTANE * .246	1.24	114%	110%	76%	111%	111%	98%
c-1,3-DICHLOROPROPENE	1.45	0.00	0.00	0.00	0.00	0.00	0.00
1,1,2-TRICHLOROETHANE	1.70	0.00	0.00	0.00	0.00	0.00	0.00
TETRACHLOROETHENE M .228	1.59	73.56	20.43	11.44	5.10	2.57	1.56
DIBROMOCHLOROMETHANE	1.50	2.34	0.00	0.00	15.13	4.14	0.00
CHLOROBENZENE M .285	1.59	48.56	0.00	1.46	4.12	0.00	0.00
ETHYLBENZENE	1.52	0.00	0.00	0.00	6.48	0.00	0.00
BROMOFORM	1.74	0.00	0.00	0.00	5.50	1.85	0.00
4-BROMOFLUOROBENZENE * .300	1.50	94%	99%	80%	99%	95%	37%
TETRACHLOROETHANE	1.76	0.00	0.00	0.00	0.00	0.00	0.00
1,3-DICHLOROBENZENE	1.58	0.00	0.00	0.00	0.00	0.00	0.00
1,4-DICHLOROBENZENE	1.55	0.00	0.00	1.90	0.00	0.00	0.00
1,2-DICHLOROBENZENE	1.50	0.00	0.00	0.00	0.00	0.00	0.00
NONANE (IS)	12.90	90%	88%	81%	92%	88%	81%
DECANE (IS)	16.50	145%	144%	108%	247%	120%	104%

OTHER COMPOUNDS							
m&p-XYLENES		0.44	0.15	0.17	6.30	0.22	0.13
o-XYLENE + STYRENE		0.20	0.06	0.41	2.49	0.41	0.21
BENZALDEHYDE		1.01	0.29	0.74	1.12	0.49	0.19
OCTANAL		0.12	0.07	0.00	0.20	0.20	0.04

* Surrogates shown in % recovery
M Matrix spike shown in % recovery
IS Internal standards shown in % recovery.
@ Indicates levels above calibrated range

USEPA COMBUSTION RESEARCH FACILITY
ANALYTICAL LABORATORY
DATE: 08-30-88

COMPOUND	PQL ug/dscm	ug/dscm Q08301348VFBK	ug/dscm Q08301428VFSK
1,1-DICHLOROETHENE M .294	1.64		
METHYLENE CHLORIDE	1.46		
t-1,2-DICHLOROETHENE	1.56		
HEXANE	1.50		
1,1-DICHLOROETHANE	1.44		
CHLOROFORM	1.59		
1,1,1-TRICHLOROETHANE M .312	1.50		107%
CARBON TETRACHLORIDE	1.50		
BENZENE M .240	1.64		130%
1,2-DICHLOROETHANE	1.50		
TRICHLOROETHENE	1.68		
1,2-DICHLOROPROPANE	1.52		
BROMODICHLOROMETHANE	1.46		
t-1,3-DICHLOROPROPENE	1.45		
TOLUENE M .243	1.50		115%
OCTANE # .246	1.24	80%	103%
c-1,3-DICHLOROPROPENE	1.45		
1,1,2-TRICHLOROETHANE	1.70		
TETRACHLOROETHENE M .228	1.59		101%
DIBROMOCHLOROMETHANE	1.50		
CHLOROBENZENE M .285	1.59		100%
ETHYLBENZENE	1.52		
BROMOFORM	1.74		
4-BROMOFLUOROBENZENE # .300	1.50	81%	96%
TETRACHLOROETHANE	1.76		
1,3-DICHLOROBENZENE	1.58		
1,4-DICHLOROBENZENE	1.55		
1,2-DICHLOROBENZENE	1.50		
NONANE (IS)	12.90	88%	83%
DECANE (IS)	16.50	90%	117%

OTHER COMPOUNDS			
m&p-XYLENES			0.13
o-XYLENE + STYRENE			0.04
BENZALDEHYDE			0.10
OCTANAL			0.04

# Surrogates shown in % recovery
M Matrix spike shown in % recovery
IS Internal standards shown in % recovery.
@ Indicates levels above calibrated range

USEPA COMBUSTION RESEARCH FACILITY
ANALYTICAL LABORATORY
DATE: 09-07-88

COMPOUND	PQL ug/dscm	ug/dscm E09071219V	ug/dscm E09071344V	ug/dscm E09071450V	ug/L CONDENSATE E09071533	ug/dscm A09071219V	ug/dscm A09071347V
1.1-DICHLOROETHENE M .294	0.03	0.00	0.00	0.00		0.00	0.00
METHYLENE CHLORIDE	0.03	0.00	0.00	0.00		0.00	0.00
t-1.2-DICHLOROETHENE	0.03	0.00	0.00	0.00		0.00	0.00
HEXANE	0.03	0.00	0.00	0.00		0.00	0.00
1.1-DICHLOROETHANE	0.03	0.00	0.00	0.00		0.00	0.00
CHLOROFORM	0.03	9.71	20.95	13.52		0.00	3.25
1.1.1-TRICHLOROETHANE M .312	0.03	0.00	0.00	0.00		0.00	0.00
CARBON TETRACHLORIDE	0.03	2.41	4.56	7.12		2.15	4.17
BENZENE M .240	0.03	1.20	3.04	25.81		0.00	13.16
1.2-DICHLOROETHANE	0.03	0.00	0.00	0.00		0.00	0.00
TRICHLOROETHENE	0.03	0.00	0.00	0.00		0.00	0.00
1.2-DICHLOROPROPANE	0.03	0.00	0.00	0.00		0.00	0.00
BROMODICHLOROMETHANE	0.03	5.83	7.70	6.25		0.00	0.00
t-1.3-DICHLOROPROPENE	0.03	0.00	0.00	0.00		0.00	0.00
TOLUENE M .243	0.03	92.51	19.97	6.55		51.88	626.28 @
OCTANE # .246	0.02	96%	100%	114%		117%	136%
c-1.3-DICHLOROPROPENE	0.03	0.00	0.00	0.00		0.00	0.00
1.1.2-TRICHLOROETHANE	0.03	0.00	0.00	0.00		0.00	0.00
TETRACHLOROETHENE M .228	0.03	12.16	3.04	0.00		7.51	114.98
DIBROMOCHLOROMETHANE	0.03	9.20	15.31	14.54	6.52	1.54	3.25
CHLOROBENZENE M .285	0.03	9.44	3.04	0.00		5.48	75.84
ETHYLBENZENE	0.03	0.00	0.00	0.00		0.00	0.00
BROMOFORM	0.03	7.49	20.46	20.53		0.00	2.32
4-BROMOFLUOROBENZENE # .300	0.03	104%	81%	103%		104%	115%
TETRACHLOROETHANE	0.04	19.98	0.00	0.00		0.00	0.00
1.3-DICHLOROBENZENE	0.03	2.47	0.00	0.00		0.00	0.00
1.4-DICHLOROBENZENE	0.03	2.43	0.00	0.00		0.00	0.00
1.2-DICHLOROBENZENE	0.03	0.00	0.00	0.00		0.00	0.00
NONANE (IS)	0.26	94%	96%	106%	121%	91%	108%
DECANE (IS)	0.33	139%	128%	156%	190%	128%	146%

OTHER COMPOUNDS							
m&p-XYLENES		0.92	0.51	0.63	2.92	0.21	1.77
o-XYLENE + STYRENE		0.37	0.22	0.45	1.17	0.11	0.67
BENZALDEHYDE		1.20	0.87	1.89	0.49	0.63	1.42
OCTANAL		0.28	0.41	0.63	0.30	0.18	0.33

Surrogates shown in % recovery
M Matrix spike shown in % recovery
IS Internal standards shown in % recovery
@ Indicates levels above calibrated range
PQL (Practical Quantitation Limit)

USEPA COMBUSTION RESEARCH FACILITY
ANALYTICAL LABORATORY
DATE: 09-07-88

COMPOUND	PQL ug/dscm	ug/dscm A09071452V	ug/dscm S09071344V	ug/dscm S09071422V	ug/dscm S09071450V	ug/L CONDENSATE S09071533	ug/dscm @07091450VFSK
1,1-DICHLOROETHENE M .294	0.03	0.00	0.00	0.00	0.00		
METHYLENE CHLORIDE	0.03	0.00	0.00	0.00	0.00		
t-1,2-DICHLOROETHENE	0.03	0.00	0.00	0.00	0.00		
HEXANE	0.03	0.00	0.00	0.00	0.00		
1,1-DICHLOROETHANE	0.03	0.00	0.00	0.00	0.00		
CHLOROFORM	0.03	11.26	11.15	18.44	10.65		3.55
1,1,1-TRICHLOROETHANE M .312	0.03	0.00	0.00	0.00	0.00		113%
CARBON TETRACHLORIDE	0.03	10.04	5.47	6.44	8.41		
BENZENE M .240	0.03	14.96	65.10	52.13	40.20		127%
1,2-DICHLOROETHANE	0.03	0.00	0.00	0.00	0.00		
TRICHLOROETHENE	0.03	0.00	0.00	0.00	1.89		
1,2-DICHLOROPROPANE	0.03	0.00	0.00	0.00	0.00		
BROMODICHLOROMETHANE	0.03	2.54	6.16	5.90	5.57		
t-1,3-DICHLOROPROPENE	0.03	0.00	0.00	0.00	0.00		
TOLUENE M .243	0.03	40.62	94.18	105.73	95.93		147%
OCTANE * .246	0.02	108%	123%	109%	134%		108%
c-1,3-DICHLOROPROPENE	0.03	0.00	0.00	0.00	0.00		
1,1,2-TRICHLOROETHANE	0.03	0.00	0.00	0.00	0.00		
TETRACHLOROETHENE M .228	0.03	6.09	10.85	19.13	10.80		100%
DIBROMOCHLOROMETHANE	0.03	2.66	20.14	8.66	0.00		
CHLOROBENZENE M .285	0.03	4.22	12.54	13.52	12.79		100%
ETHYLBENZENE	0.03	0.00	14.32	5.95	6.12		
BROMOFORM	0.03	0.00	10.24	10.92	17.71		
4-BROMOFLUOROBENZENE * .300	0.03	95%	96%	98%	111%		93%
TETRACHLOROETHANE	0.04	0.00	0.00	0.00	0.00		
1,3-DICHLOROBENZENE	0.03	0.00	2.24	0.00	0.00		
1,4-DICHLOROBENZENE	0.03	0.00	1.87	0.00	0.00		
1,2-DICHLOROBENZENE	0.03	2.03	2.14	0.00	22.69		
NONANE (IS)	0.26	104%	106%	81%	121%	100%	84%
DECANE (IS)	0.33	159%	270%	102%	186%	136%	98%

OTHER COMPOUNDS

m&p-XYLENES		0.36	10.46	3.05	2.04	1.38	0.25
o-XYLENE + STYRENE		0.17	3.31	1.34	1.21	0.49	0.10
BENZALDEHYDE		0.78	1.75	2.55	2.46	0.28	0.58
OCTANAL		0.19	0.37	0.22	0.43		0.06

* Surrogates shown in % recovery
M Matrix spike shown in % recovery
IS Internal standards shown in % recovery
@ Indicates levels above calibrated range
PQL (Practical Quantitation Limit)

USEPA COMBUSTION RESEARCH FACILITY
ANALYTICAL LABORATORY
DATE: 09-07-88

COMPOUND	PQL ug/dscm	ug/dscm Q09071221VFBK
1,1-DICHLOROETHENE M .294	0.03	
METHYLENE CHLORIDE	0.03	
t-1,2-DICHLOROETHENE	0.03	
HEXANE	0.03	
1,1-DICHLOROETHANE	0.03	
CHLOROFORM	0.03	
1,1,1-TRICHLOROETHANE M .312	0.03	
CARBON TETRACHLORIDE	0.03	
BENZENE M .240	0.03	39.00
1,2-DICHLOROETHANE	0.03	
TRICHLOROETHENE	0.03	
1,2-DICHLOROPROPANE	0.03	
BROMODICHLOROMETHANE	0.03	
t-1,3-DICHLOROPROPENE	0.03	
TOLUENE M .243	0.03	
OCTANE * .246	0.02	80%
c-1,3-DICHLOROPROPENE	0.03	
1,1,2-TRICHLOROETHANE	0.03	
TETRACHLOROETHENE M .228	0.03	
DIBROMOCHLOROMETHANE	0.03	1.52
CHLOROBENZENE M .285	0.03	
ETHYLBENZENE	0.03	
BROMOFORM	0.03	
4-BROMOFLUOROBENZENE * .300	0.03	88%
TETRACHLOROETHANE	0.04	
1,3-DICHLOROBENZENE	0.03	
1,4-DICHLOROBENZENE	0.03	
1,2-DICHLOROBENZENE	0.03	
NONANE (IS)	0.26	61%
DECANE (IS)	0.33	66%

OTHER COMPOUNDS	
m&p-XYLENES	0.13
o-XYLENE + STYRENE	0.08
BENZALDEHYDE	0.50
OCTANAL	0.12

* Surrogates shown in % recovery
M Matrix spike shown in % recovery
IS Internal standards shown in % recovery
@ Indicates levels above calibrated range
PQL (Practical Quantitation Limit)

USEPA COMBUSTION RESEARCH FACILITY
ANALYTICAL LABORATORY
TRACE METALS VOST ANALYSIS
ANALYSIS DATE: 09-09-88

COMPOUND	PQL ug/dscm	ug/dscm A09091151V	ug/dscm A09091232V	ug/dscm A09091353V	ug/dscm S09091149V	ug/dscm S09091229V	ug/dscm S09091350V	ug/L CONDENSATE S09091414
1,1-DICHLOROETHENE M .294	1.64	0.00	0.00	0.00	0.00	0.00	0.00	
METHYLENE CHLORIDE	1.46	0.00	0.00	0.00	0.00	0.00	0.00	
t-1,2-DICHLOROETHENE	1.56	0.00	0.00	0.00	0.00	0.00	0.00	
HEXANE	1.50	0.00	0.00	0.00	0.00	0.00	0.00	
1,1-DICHLOROETHANE	1.44	0.00	0.00	0.00	0.00	0.00	0.00	
CHLOROFORM	1.59	8.25	10.97	7.75	5.79	3.98	22.64	
1,1,1-TRICHLOROETHANE M .312	1.50	0.00	0.00	0.00	0.00	0.00	0.00	
CARBON TETRACHLORIDE	1.50	4.58	5.61	6.27	4.13	3.53	15.96	
BENZENE M .240	1.64	2.25	20.08	9.58	72.22	21.70	78.80	
1,2-DICHLOROETHANE	1.50	0.00	0.00	0.00	0.00	0.00	0.00	
TRICHLOROETHENE	1.68	0.00	2.35	0.00	0.00	3.06	9.87	
1,2-DICHLOROPROPANE	1.52	0.00	0.00	0.00	0.00	0.00	0.00	
BROMODICHLOROMETHANE	1.46	0.00	2.85	1.62	2.67	2.65	6.18	
t-1,3-DICHLOROPROPENE	1.45	0.00	0.00	0.00	0.00	0.00	0.00	
TOLUENE M .243	1.50	39.98	6.06	11.46	101.90	34.27	118.70	
OCTANE * .246	1.24	79%	116%	116%	122%	79%	165%	
c-1,3-DICHLOROPROPENE	1.45	0.00	0.00	0.00	0.00	0.00	0.00	
1,1,2-TRICHLOROETHANE	1.70	0.00	0.00	0.00	0.00	0.00	0.00	
TETRACHLOROETHENE M .226	1.59	8.01	4.22	2.81	16.64	5.53	0.00	
DIBROMOCHLOROMETHANE	1.50	0.00	5.16	1.46	25.96	13.61	15.41	
CHLOROBENZENE M .285	1.59	3.58	0.00	1.50	14.59	7.46	14.96	
ETHYLBENZENE	1.52	0.00	0.00	0.00	17.10	3.47	4.38	
BROMOFORM	1.74	0.00	0.00	0.00	4.59	11.16	17.95	
4-BROMOFLUOROBENZENE * .300	1.50	89%	92%	106%	120%	108%	120%	
TETRACHLOROETHANE	1.76	0.00	0.00	0.00	0.00	0.00	0.00	
1,3-DICHLOROBENZENE	1.58	0.00	0.00	0.00	0.00	0.00	2.46	
1,4-DICHLOROBENZENE	1.55	0.00	0.00	0.00	0.00	0.00	2.14	
1,2-DICHLOROBENZENE	1.50	0.00	0.00	0.00	0.00	0.00	12.52	
NONANE (IS)	12.90	72%	108%	105%	124%	99%	124%	98%
DECANE (IS)	16.50	98%	163%	164%	493%	198%	152%	126%

OTHER COMPOUNDS								
m&p-XYLENES		0.12	0.55	0.33	14.95	2.39	2.44	0.86
o-XYLENE + STYRENE		0.11	0.31	0.18	4.69	1.67	3.08	0.33
BENZALDEHYDE		0.54	1.73	0.56	2.72	3.87	2.72	0.13
OCTANAL		0.05	0.17	0.09	0.56	0.72	0.48	0.20

* Surrogates shown in % recovery
M Matrix spike shown in % recovery
IS Internal standards shown in % recovery
@ Indicates levels above calibrated range

USEPA COMBUSTION RESEARCH FACILITY
ANALYTICAL LABORATORY
TRACE METALS VOST ANALYSIS
ANALYSIS DATE: 09-09-88

COMPOUND	PQL ug/dsca	ug/dsca E09091149V	ug/dsca E09091230V	ug/dsca E09091350V	ug/L CONDENSATE E09091414	ug/dsca Q09091350VFSK	ug/dsca Q09091200VFBK
1,1-DICHLOROETHENE M .294	1.64	0.00	0.00	0.00			
METHYLENE CHLORIDE	1.46	0.00	0.00	0.00			
t-1,2-DICHLOROETHENE	1.56	0.00	0.00	0.00			
HEXANE	1.50	0.00	0.00	0.00			
1,1-DICHLOROETHANE	1.44	0.00	0.00	0.00			
CHLOROFORM	1.59	10.02	2.74	4.17			
1,1,1-TRICHLOROETHANE M .312	1.50	0.00	0.00	0.00		90%	
CARBON TETRACHLORIDE	1.50	4.45	0.00	2.25		1.68	
BENZENE M .240	1.64	4.11	10.18	35.89		194%	1.63
1,2-DICHLOROETHANE	1.50	0.00	0.00	0.00			
TRICHLOROETHENE	1.68	0.00	0.00	0.00			
1,2-DICHLOROPROPANE	1.52	0.00	0.00	0.00			
BROMODICHLOROMETHANE	1.46	2.15	2.34	3.16			
t-1,3-DICHLOROPROPENE	1.45	0.00	0.00	0.00			
TOLUENE M .243	1.50	17.76	35.76	27.69		124%	
OCTANE # .246	1.24	133%	135%	118%		104%	120%
c-1,3-DICHLOROPROPENE	1.45	0.00	0.00	0.00			
1,1,2-TRICHLOROETHANE	1.70	0.00	0.00	0.00			
TETRACHLOROETHENE M .228	1.59	2.29	6.26	3.97		107%	
DIBROMOCHLOROMETHANE	1.50	11.18	8.45	7.99		1.59	2.07
CHLOROBENZENE M .285	1.59	2.22	4.15	3.52		108%	
ETHYLBENZENE	1.52	26.93	0.00	0.00			
BROMOFORM	1.74	9.57	11.25	9.75			
4-BROMOFLUOROBENZENE # .300	1.50	102%	101%	101%		110%	96%
TETRACHLOROETHANE	1.76	0.00	38.65	0.00			
1,3-DICHLOROBENZENE	1.58	0.00	2.43	0.00			
1,4-DICHLOROBENZENE	1.55	2.67	2.45	0.00	6.51		
1,2-DICHLOROBENZENE	1.50	0.00	4.24	0.00			
NONANE (IS)	12.90	121%	95%	109%	103%	90%	91%
DECANE (IS)	16.50	563%	119%	153%	131%	144%	101%

OTHER COMPOUNDS						
m&p-XYLENES	25.58	0.24	0.32	2.50	0.16	0.21
o-XYLENE + STYRENE	8.54	0.52	0.51	1.08	0.08	0.08
BENZALDEHYDE	1.94	0.82	1.84	0.18	0.55	0.31
OCTANAL	0.00	0.34	0.44	0.18	0.13	0.10

Surrogates shown in % recovery
M Matrix spike shown in % recovery
IS Internal standards shown in % recovery
@ Indicates level above calibrated range

USEPA COMBUSTION RESEARCH FACILITY
ANALYTICAL LABORATORY
TRACE METALS VOST ANALYSIS
ANALYSIS DATE: 09-14-88

COMPOUND	PQL ug/dscm	ug/dscm E0914115BV	ug/dscm E0914123AV	ug/dscm E0914130OV	ug/dscm A0914120OV	ug/dscm A0914123ZV	ug/dscm A0914130IV
1,1-DICHLOROETHENE M .294	1.64	0.00	0.00	0.00	0.00	0.00	0.00
METHYLENE CHLORIDE	1.46	0.00	0.00	0.00	0.00	0.00	0.00
t-1,2-DICHLOROETHENE	1.56	0.00	0.00	0.00	0.00	0.00	0.00
HEXANE	1.50	0.00	0.00	0.00	0.00	0.00	0.00
1,1-DICHLOROETHANE	1.44	0.00	0.00	0.00	0.00	0.00	0.00
CHLOROFORM	1.59	4.77	1.74	6.28	4.12	0.00	0.00
1,1,1-TRICHLOROETHANE M .312	1.50	0.00	0.00	0.00	3.84	0.00	0.00
CARBON TETRACHLORIDE	1.50	0.00	0.00	0.00	1.70	0.00	0.00
BENZENE M .240	1.64	0.00	0.00	0.00	20.14	0.00	0.00
1,2-DICHLOROETHANE	1.50	0.00	0.00	0.00	0.00	0.00	0.00
TRICHLOROETHENE	1.68	0.00	0.00	0.00	0.00	0.00	0.00
1,2-DICHLOROPROPANE	1.52	0.00	0.00	0.00	0.00	0.00	0.00
BROMODICHLOROMETHANE	1.46	0.00	0.00	0.00	0.00	0.00	0.00
t-1,3-DICHLOROPROPENE	1.45	0.00	0.00	0.00	0.00	0.00	0.00
TOLUENE M .243	1.50	9.82	84.24	51.07	145.63 @	81.84	28.59
OCTANE * .246	1.24	118.00%	107.00%	109.00%	121.00%	101.00%	76.00%
c-1,3-DICHLOROPROPENE	1.45	11.08	0.00	0.00	0.00	0.00	0.00
1,1,2-TRICHLOROETHANE	1.70	0.00	0.00	0.00	0.00	0.00	0.00
TETRACHLOROETHENE M .220	1.59	0.00	0.00	0.00	37.16	6.91	6.21
DIBROMOCHLOROMETHANE	1.50	13.51	4.70	11.76	1.84	0.00	0.00
CHLOROBENZENE M .285	1.59	0.00	0.00	0.00	2.95	0.00	0.00
ETHYLBENZENE	1.52	16.09	0.00	0.00	0.00	0.00	0.00
BROMOFORM	1.74	0.00	0.00	0.00	0.00	0.00	0.00
4-BROMOFLUOROBENZENE * .300	1.50	100.00%	104.00%	98.00%	107.00%	86.00%	81.00%
TETRACHLOROETHANE	1.76	0.00	0.00	0.00	0.00	0.00	0.00
1,3-DICHLOROBENZENE	1.58	0.00	0.00	0.00	2.22	1.85	1.68
1,4-DICHLOROBENZENE	1.55	0.00	0.00	0.00	0.00	0.00	0.00
1,2-DICHLOROBENZENE	1.50	0.00	3.90	0.00	0.00	0.00	0.00
NONANE (IS)	12.90	103.00%	90.00%	88.00%	95.00%	80.00%	61.00%
DECANE (IS)	16.50	479.00%	104.00%	104.00%	142.00%	95.00%	92.00%

OTHER COMPOUNDS						
m&p-XYLENES	20.46	0.58	0.31	0.23	0.15	0.10
o-XYLENE + STYRENE	6.90	1.20	0.97	0.84	0.07	0.03
BENZALDEHYDE	1.60	1.35	1.13	3.31	1.35	0.30
OCTANAL	0.00	0.15	0.15	0.28	0.08	0.09

* Surrogates shown % recovery.
M Matrix spike shown in % recovery.
IS Internal standards shown in % recovery.
@ indicates levels above calibrated range.

USEPA COMBUSTION RESEARCH FACILITY
ANALYTICAL LABORATORY
TRACE METALS VOST ANALYSIS
ANALYSIS DATE: 09-14-88

COMPOUND	PQL ug/dscm	ug/L CONDENSATE E0914	ug/dscm Q09141300VFSK	ug/dscm Q09141300VFBK
1,1-DICHLOROETHENE M .294	1.64			
METHYLENE CHLORIDE	1.46			
t-1,2-DICHLOROETHENE	1.56			
HEXANE	1.50			
1,1-DICHLOROETHANE	1.44			
CHLOROFORM	1.59			
1,1,1-TRICHLOROETHANE M .312	1.50		111.00%	
CARBON TETRACHLORIDE	1.50			
BENZENE M .240	1.64		73.00%	
1,2-DICHLOROETHANE	1.50			
TRICHLOROETHENE	1.68			
1,2-DICHLOROPROPANE	1.52			
BROMODICHLOROMETHANE	1.46			
t-1,3-DICHLOROPROPENE	1.45			
TOLUENE M .243	1.50		123.00%	0.19
OCTANE # .246	1.24		107.00%	101.00%
c-1,3-DICHLOROPROPENE	1.45			
1,1,2-TRICHLOROETHANE	1.70			
TETRACHLOROETHENE M .228	1.59		104.00%	
DIBROMOCHLOROMETHANE	1.50			
CHLOROBENZENE M .285	1.59		102.00%	
ETHYLBENZENE	1.52			
BROMOFORM	1.74			
4-BROMOFLUOROBENZENE # .300	1.50		105.00%	97.00%
TETRACHLOROETHANE	1.76			
1,3-DICHLOROBENZENE	1.58			0.04
1,4-DICHLOROBENZENE	1.55			
1,2-DICHLOROBENZENE	1.50			
NONANE (IS)	12.90	83.00%	88.00%	70.00%
DECANE (IS)	16.50	113.00%	122.00%	81.00%

OTHER COMPOUNDS				
m&p-XYLENES			0.17	0.11
o-XYLENE + STYRENE			0.06	0.01
BENZALDEHYDE			0.48	0.43
OCTANAL			0.06	0.11

Surrogates shown % recovery.
M Matrix spike shown in % recovery.
IS Internal standards shown in % recovery.
@ Indicates levels above calibrated range.

USEPA COMBUSTION RESEARCH FACILITY
ANALYTICAL LABORATORY
TRACE METALS VOST ANALYSIS
ANALYSIS DATE: 09-16-88

COMPOUND	PQL (ug/dscm)	ug/dscm A09161132V	ug/dscm A09161255V	ug/dscm A09161216V	ug/dscm E09161134V	ug/dscm E09161220V	ug/dscm E09161310V
1,1-DICHLOROETHENE M .294	1.64	0.00	0.00	0.00	0.00	0.00	0.00
METHYLENE CHLORIDE	1.46	0.00	0.00	0.00	0.00	0.00	0.00
t-1,2-DICHLOROETHENE	1.56	0.00	0.00	0.00	0.00	0.00	0.00
HEXANE	1.50	0.00	0.00	0.00	0.00	0.00	0.00
1,1-DICHLOROETHANE	1.44	0.00	0.00	0.00	0.00	0.00	0.00
CHLOROFORM	1.59	7.09	4.82	3.91	9.67	9.52	5.93
1,1,1-TRICHLOROETHANE M .312	1.50	0.00	0.00	0.00	0.00	0.00	0.00
CARBON TETRACHLORIDE	1.50	4.89	4.84	6.22	2.15	2.11	2.07
BENZENE M .240	1.64	0.00	0.00	0.00	8.41	3.59	2.50
1,2-DICHLOROETHANE	1.50	0.00	0.00	0.00	0.00	0.00	0.00
TRICHLOROETHENE	1.68	0.00	0.00	0.00	0.00	0.00	0.00
1,2-DICHLOROPROPANE	1.52	0.00	0.00	0.00	0.00	0.00	0.00
BROMODICHLOROMETHANE	1.46	0.00	0.00	0.00	5.95	5.93	3.84
t-1,3-DICHLOROPROPENE	1.45	0.00	0.00	0.00	0.00	0.00	0.00
TOLUENE M .243	1.50	29.57	4.21	6.84	54.15	119.61	46.31
OCTANE * .246	1.24	107.00%	114.00%	115.00%	109.00%	111.00%	0.00%
c-1,3-DICHLOROPROPENE	1.45	0.00	0.00	0.00	0.00	0.00	0.00
1,1,2-TRICHLOROETHANE	1.70	0.00	0.00	0.00	0.00	0.00	0.00
TETRACHLOROETHENE M .228	1.59	20.91	3.96	13.58	8.22	16.55	6.32
DIBROMOCHLOROMETHANE	1.50	0.00	0.00	0.00	25.29	14.80	9.38
CHLOROBENZENE M .285	1.59	2.34	0.00	0.00	6.19	11.41	4.50
ETHYLBENZENE	1.52	0.00	0.00	0.00	15.04	0.00	0.00
BROMOFORM	1.74	0.00	0.00	0.00	12.04	13.46	10.62
4-BROMOFLUOROBENZENE * .300	1.50	83.00%	101.00%	105.00%	104.00%	106.00%	0.00%
TETRACHLOROETHANE	1.76	0.00	0.00	0.00	0.00	0.00	0.00
1,3-DICHLOROBENZENE	1.58	0.00	0.00	0.00	1.57	0.00	0.00
1,4-DICHLOROBENZENE	1.55	0.00	0.00	0.00	1.53	0.00	0.00
1,2-DICHLOROBENZENE	1.50	0.00	0.00	0.00	6.14	0.00	0.00
NONANE	12.90	100.00%	100.00%	102.00%	100.00%	92.00%	93.00%
DECANE	16.50	119.00%	129.00%	131.00%	515.00%	132.00%	136.00%

OTHER COMPOUNDS						
m&p-XYLENES	0.18	0.21	0.18	15.86	0.41	0.28
o-XYLENE + STYRENE	0.08	0.14	0.10	4.80	0.46	0.38
BENZALDEHYDE	0.37	0.34	1.08	1.68	1.43	0.61
OCTANAL	0.05	0.05	0.11	0.00	0.20	0.12

* Surrogates in % recovery
M Matrix spike in % recovery
IS Internal standards in % recovery
@ Indicates levels above calibrated range
PQL (Practical Quantitation Limit)

USEPA COMBUSTION RESEARCH FACILITY
ANALYTICAL LABORATORY
TRACE METALS VOST ANALYSIS
ANALYSIS DATE: 09-16-88

COMPOUND	PQL (ug/dscm)	ug/L CONDENSATE E09161335	ug/dscm Q09161310VFBK	ug/dscm Q09161220VFBK
1,1-DICHLOROETHENE M .294	1.64			
METHYLENE CHLORIDE	1.46			
t-1,2-DICHLOROETHENE	1.56			
HEXANE	1.50			
1,1-DICHLOROETHANE	1.44			
CHLOROFORM	1.59		1.82	1.75
1,1,1-TRICHLOROETHANE M .312	1.50			
CARBON TETRACHLORIDE	1.50			
BENZENE M .240	1.64			
1,2-DICHLOROETHANE	1.50			
TRICHLOROETHENE	1.68			
1,2-DICHLOROPROPANE	1.52			
BROMODICHLOROMETHANE	1.46			
t-1,3-DICHLOROPROPENE	1.45			
TOLUENE M .243	1.50			
OCTANE * .246	1.24		109.00%	105.00%
c-1,3-DICHLOROPROPENE	1.45			
1,1,2-TRICHLOROETHANE	1.70			
TETRACHLOROETHENE M .228	1.59			
DIBROMOCHLOROMETHANE	1.50	7.24		1.97
CHLOROBENZENE M .285	1.59			
ETHYLBENZENE	1.52			
BROMOFORM	1.74			
4-BROMOFLUOROBENZENE * .300	1.50		106.00%	102.00%
TETRACHLOROETHANE	1.76			
1,3-DICHLOROBENZENE	1.58			
1,4-DICHLOROBENZENE	1.55			
1,2-DICHLOROBENZENE	1.50			
NONANE	12.90	88.00%	183.00%	86.00%
DECANE	16.50	129.00%	238.00%	124.00%

OTHER COMPOUNDS				
m&p-XYLENES			0.15	0.13
o-XYLENE + STYRENE			0.06	0.09
BENZALDEHYDE			0.24	0.53
OCTANAL			0.04	0.13

* Surrogates in % recovery
M Matrix spike in % recovery
IS Internal standards in % recovery
@ Indicates levels above calibrated range
PQL (Practical Quantitation Limit)

USEPA COMBUSTION RESEARCH FACILITY
ANALYTICAL LABORATORY
DATE:09-20-88

COMPOUND	PQL (ug/dscm)	ug/dscm E09201054VT1	ug/dscm E09201328VT1	ug/dscm A09201435VT1	ug/L E09201510T1	ug/dscm A09201053VT1
1,1-DICHLOROETHENE M .294	1.64	0.00	0.00	0.00		0.00
METHYLENE CHLORIDE	1.46	0.00	0.00	0.00		0.00
t-1,2-DICHLOROETHENE	1.56	0.00	0.00	0.00		0.00
HEXANE	1.50	0.00	0.00	0.00		0.00
1,1-DICHLOROETHANE	1.44	0.00	0.00	0.00		0.00
CHLOROFORM	1.59	12.16	22.01	4.94		6.27
1,1,1-TRICHLOROETHANE M .312	1.50	0.00	0.00	0.00		0.00
CARBON TETRACHLORIDE	1.50	1.52	3.95	4.94		24.83
BENZENE M .240	1.64	8.36	19.18	19.37		0.00
1,2-DICHLOROETHANE	1.50	2.18	3.22	0.00		0.00
TRICHLOROETHENE	1.68	0.00	0.00	0.00		2.28
1,2-DICHLOROPROPANE	1.52	0.00	0.00	0.00		0.00
BROMODICHLOROMETHANE	1.46	3.80	12.69	0.00		0.00
t-1,3-DICHLOROPROPENE	1.45	0.00	0.00	0.00		0.00
TOLUENE M .243	1.50	15.46	19.13	659.74@	11.10	405.00@
OCTANE # .246	1.24	81.30%	117.00%	115.00%		122.00%
c-1,3-DICHLOROPROPENE	1.45	0.00	0.00	0.00		4.49
1,1,2-TRICHLOROETHANE	1.70	0.00	0.00	0.00		0.00
TETRACHLOROETHENE M .228	1.59	4.82	2.73	109.45		63.48
DIBROMOCHLOROMETHANE	1.50	77.55	27.28	3.98		7.21
CHLOROBENZENE M .285	1.59	0.00	1.66	72.63		44.08
ETHYLBENZENE	1.52	19.51	0.00	0.00		0.00
BROMOFORM	1.74	15.71	11.62	5.35		4.14
4-BROMOFLUOROBENZENE # .300	1.50	101.00%	91.00%	92.00%		107.00%
TETRACHLOROETHANE	1.76	0.00	0.00	0.00		0.00
1,3-DICHLOROBENZENE	1.58	0.00	0.00	0.00		0.00
1,4-DICHLOROBENZENE	1.55	0.00	4.44	0.00		0.00
1,2-DICHLOROBENZENE	1.50	4.61	6.49	2.82		2.17
NONANE (IS)	12.90	79.00%	95.00%	92.00%	82.00%	104.00%
DECANE (IS)	16.50	238.00%	111.00%	116.00%	114.00%	145.00%

OTHER COMPOUNDS					
m&p- XYLENE	10.85	0.59	0.61		0.74
o-XYLENE + STYRENE	5.98	0.49	0.20		0.44
BENZALDEHYDE	1.76	1.05	0.63		1.06
OCTANAL	6.49	2.56	0.26		0.25

Surrogates shown in % recovery
M Matrix spike shown in % recovery
IS Internal Standards shown in % recovery
@ Indicates levels above calibrated range

USEPA COMBUSTION RESEARCH FACILITY
ANALYTICAL LABORATORY
DATE:09-20-88

COMPOUND	PQL (ug/dscm)	ug/dscm G09201056VFBK	ug/dscm A09201331VT1	ug/dscm E09201430VT1	ug/dscm G09201332MVFSKT1
1,1-DICHLOROETHENE M .294	1.64		0.00	0.00	
METHYLENE CHLORIDE	1.46		0.00	0.00	
t-1,2-DICHLOROETHENE	1.56		0.00	0.00	
HEXANE	1.50		0.00	0.00	
1,1-DICHLOROETHANE	1.44		0.00	0.00	
CHLOROFORM	1.59		8.13	19.30	
1,1,1-TRICHLOROETHANE M .312	1.50		0.00	0.00	103.00%
CARBON TETRACHLORIDE	1.50		5.96	5.28	
BENZENE M .240	1.64		0.00	19.58	92.00%
1,2-DICHLOROETHANE	1.50		0.00	0.00	
TRICHLOROETHENE	1.68		0.00	0.00	
1,2-DICHLOROPROPANE	1.52		0.00	0.00	
BROMODICHLOROMETHANE	1.46		0.00	14.07	
t-1,3-DICHLOROPROPENE	1.45		0.00	0.00	
TOLUENE M .243	1.50		471.22@	28.69	131.00%
OCTANE * .246	1.24	106.00%	117.00%	178.00%	112.00%
c-1,3-DICHLOROPROPENE	1.45		0.00	0.00	
1,1,2-TRICHLOROETHANE	1.70		0.00	0.00	
TETRACHLOROETHENE M .228	1.59		85.59	4.57	111.00%
DIBROMOCHLOROMETHANE	1.56		30.50	17.06	
CHLOROBENZENE M .285	1.59		46.81	2.64	107.00%
ETHYLBENZENE	1.57		0.00	0.00	
BROMOFORM	1.74		2.06	13.15	
4-BROMOFLUOROBENZENE * .300	1.56	94.00%	104.00%	110.00%	105.00%
TETRACHLOROETHANE	1.76		0.00	0.00	
1,3-DICHLOROBENZENE	1.58		0.00	0.00	
1,4-DICHLOROBENZENE	1.55		0.00	0.00	
1,2-DICHLOROBENZENE	1.50		0.00	2.64	
NONANE (IS)	12.90	87.00%	102.00%	139.00%	102.00%
DECANE (IS)	16.50	100.00%	131.00%	142.00%	133.00%

OTHER COMPOUNDS				
m&p- XYLENE	0.10	0.54	0.36	
o-XYLENE + STYRENE	0.04	7.00	0.56	
BENZALDEHYDE	0.37	1.59	0.82	
OCTANAL	0.08	0.18	0.12	

* Surrogates shown in % recovery
M Matrix spike shown in % recovery
IS Internal Standards shown in % recovery
@ Indicates levels above calibrated range

USEPA COMBUSTION RESEARCH FACILITY

COMPOUND	PQL (ug/dscm)	ug/dscm E09221030V	ug/dscm E09221107V	ug/dscm E09221151V	ug/dscm A09221032V	ug/dscm A09221108V	ug/dscm A09221150V
1,1-DICHLOROETHENE M .294	1.64	0.00	0.00	0.00	0.00	0.00	0.00
METHYLENE CHLORIDE	1.46	0.00	0.00	0.00	0.00	0.00	0.00
t-1,2-DICHLOROETHENE	1.56	0.00	0.00	0.00	0.00	0.00	0.00
HEXANE	1.50	0.00	0.00	0.00	0.00	0.00	0.00
1,1-DICHLOROETHANE	1.44	0.00	0.00	0.00	0.00	0.00	0.00
CHLOROFORM	1.59	31.62	28.12	23.47	4.45	4.08	6.04
1,1,1-TRICHLOROETHANE M .312	1.50	0.00	0.00	0.00	0.00	0.00	0.00
CARBON TETRACHLORIDE	1.50	1.98	2.90	2.07	0.00	0.00	0.00
BENZENE M .240	1.64	5.86	6.27	5.22	9.34	21.59	4.09
1,2-DICHLOROETHANE	1.50	0.00	0.00	0.00	0.00	0.00	0.00
TRICHLOROETHENE	1.68	0.00	0.00	0.00	0.00	0.00	0.00
1,2-DICHLOROPROPANE	1.52	0.00	0.00	0.00	0.00	0.00	0.00
BROMODICHLOROMETHANE	1.46	32.42	31.12	34.41	0.00	0.00	0.00
t-1,3-DICHLOROPROPENE	1.45	0.00	0.00	0.00	0.00	0.00	0.00
TOLUENE M .243	1.50	4.15	164.26@	16.51	106.09	3358.07@	323.64@
OCTANE # .246	1.28	111.00%	117.00%	112.00%	115.00%	0.00%	111.00%
c-1,3-DICHLOROPROPENE	1.45	0.00	0.00	0.00	0.00	0.00	0.00
1,1,2-TRICHLOROETHANE	1.70	0.00	0.00	0.00	0.00	0.00	0.00
TETRACHLOROETHENE M .228	1.59	0.00	62.23	7.77	36.71	2054.79@	160.82
DIBROMOCHLOROMETHANE	1.50	57.13	58.37	74.65	5.87	23.07	4.99
CHLOROBENZENE M .288	1.59	0.00	43.13	8.54	24.49	1464.99@	150.33 @
ETHYLBENZENE	1.52	6.28	0.00	0.00	0.00	0.00	0.00
BROMOFORM	1.74	42.55	52.10	87.94	3.69	4.23	4.72
4-BROMOFLUOROBENZENE # .300	1.50	106.00%	97.00%	105.00%	96.00%	110.00%	105.00%
TETRACHLOROETHANE	1.76	0.00	0.00	0.00	0.00	0.00	0.00
1,3-DICHLOROBENZENE	1.58	0.00	0.00	0.00	0.00	0.00	0.00
1,4-DICHLOROBENZENE	1.55	0.00	0.00	0.00	0.00	0.00	0.00
1,2-DICHLOROBENZENE	1.50	0.00	1.93	0.00	0.00	0.00	0.00
NONANE (IS)	12.90	94.00%	96.00%	90.00%	85.00%	77.00%	88.00%
DECANE (IS)	16.50	222.00%	126.00%	122.00%	108.00%	84.00%	120.00%

OTHER COMPOUNDS

m&p-Xylenes	7.77	0.39	0.28	0.67	3.63	0.84
o-Xylene + Styrene	2.47	0.39	0.36	0.27	0.49	0.30
Benzaldehyde	1.56	2.36	1.07	0.81	1.29	1.52
Octanal	0.48	0.47	0.44	0.25	0.17	0.30

# Surrogates shown in % recovery

M Matrix spike shown in % recovery

@ Indicates levels above calibrated range

No reported values indicate levels below PQL.

PQL (Practical Quantitation Limit)

USEPA COMBUSTION RESEARCH FACILITY

COMPOUND	PQL (ug/dscm)	ug/dscm S09221033V	ug/dscm S09221112V	ug/dscm S09221154V	ug/dscm Q09221030VFBK	ug/dscm Q09221107VFSK	ug/L CONDENSATE S09221550
1,1-DICHLOROETHENE M .294	1.64	0.00	0.00	0.00	0.00		
METHYLENE CHLORIDE	1.46	0.00	0.00	0.00	0.00		
t-1,2-DICHLOROETHENE	1.56	0.00	0.00	0.00	0.00		
HEXANE	1.50	0.00	0.00	0.00	0.00		
1,1-DICHLOROETHANE	1.44	0.00	0.00	0.00	0.00		
CHLOROFORM	1.59	8.06	20.65	18.11	0.00		
1,1,1-TRICHLOROETHANE M .312	1.50	0.00	0.00	0.00	0.00	126.00%	
CARBON TETRACHLORIDE	1.50	8.12	21.63	19.30	0.00		
BENZENE M .240	1.64	11.86	13.42	14.58	2.14	153.00%	
1,2-DICHLOROETHANE	1.50	0.00	0.00	0.00	0.00		
TRICHLOROETHENE	1.68	0.00	0.00	0.00	0.00		
1,2-DICHLOROPROPANE	1.52	0.00	0.00	0.00	0.00		
BROMODICHLOROMETHANE	1.46	17.86	22.33	23.64	0.00		
t-1,3-DICHLOROPROPENE	1.45	0.00	0.00	0.00	0.00		
TOLUENE M .243	1.50	67.45	203.01@	76.45	0.00	121.00%	
OCTANE * .246	1.24	91.00%	122.00%	123.00%	100.00%	105.00%	
c-1,3-DICHLOROPROPENE	1.45	0.00	0.00	0.00	0.00		
1,1,2-TRICHLOROETHANE	1.70	0.00	0.00	0.00	0.00		
TETRACHLOROETHENE M .228	1.59	9.27	66.11	11.98	0.00		
DIBROMOCHLOROMETHANE	1.50	53.75	57.78	59.10	3.11	100.00%	
CHLOROBENZENE M .285	1.59	9.75	44.42	12.85	0.00	97.00%	
ETHYLBENZENE	1.52	15.44	4.77	5.21	0.00		
BROMOFORM	1.74	30.88	57.32	65.12	0.00		
4-BROMOFLUOROBENZENE * .300	1.50	79.00%	108.00%	107.00%	88.00%	98.00%	
TETRACHLOROETHANE	1.76	0.00	0.00	0.00	0.00		
1,3-DICHLOROBENZENE	1.58	0.00	0.00	0.00	0.00		
1,4-DICHLOROBENZENE	1.55	0.00	0.00	0.00	0.00		
1,2-DICHLOROBENZENE	1.50	0.00	2.76	0.00	1.93		
NONANE (IS)	12.90	91.00%	102.00%	94.00%	69.00%	82.00%	89.00%
DECANE (IS)	16.50	209.00%	126.00%	103.00%	87.00%	104.00%	113.00%

OTHER COMPOUNDS							
m&p-Xylenes		11.33	1.76	1.70	0.11		
o-Xylene + Styrene		3.26	1.27	1.47	0.07		
Benzaldehyde		1.02	1.88	1.12	0.90		
Octanal		0.56	0.55	0.34	0.15		

* Surrogates shown in % recovery
M Matrix spike shown in % recovery
@ Indicates levels above calibrated range
No reported values indicate levels below
PQL.
PQL (Practical Quantitation Limit)

APPENDIX C

SAMPLING TRAIN DATA SHEETS

In the following, sampling trains are designated by ID numbers. The ID code for each train follows the sample coding scheme described in Appendix B.

```
ISOKINETIC RESULTS
Plant: CRF        Updated  06/28/88  Performed by:        C.KING, G.HILL
Da     06/25/88   Printed  01/26/89  Test No./Type:       A06251200M17
Sample Location:  AFTERBURNER        Start/Stop Time:     1200-1225

PARAMETER                                SYMBOL     VALUE
                                                   (calc.)
Nozzle Diameter, Actual (in)             N(d)         1.46
Pitot Tube Correction Factor             C(p)         0.84
Gas Meter Correction Factor              (alpha)      0.98
Stack (Duct) Dimensions (in):
        Radius (if round)                R
        Length (if rectangular)          L              20
        Width (if rectangular)           W           12.25
Area of Stack (sq ft)                    A(s)     (1.70138 )

# of Sample Points                       #               1
Total Sampling Time (min)                (theta)  (  25.00 )
Barometric Pressure (in Hg)              P(b)           30
Stack Pressure (in H2O)                  P(stack)    -0.08
Gas Meter Initial Reading (cu ft)                    900.4
Gas Meter Final Reading (cu ft)                     1015.4
Net Gas Sample Volume (cu ft)            V(m)     ( 115.00 )

Vol of Liquid Collected (ml)             Vl(c)      181.38
Vol of Liq @ Std. Conds. (scf)           V(w std) (  8.536 )
Wt. of Filter Particulate (gm)                           0
Wt.    Probe Wash Particulate (gm)                       0
Wt. of Combined Particulate (gm)         M(n)     ( 0.0000 )

O2  Concentration (by CEM)               %             8.7
CO2 Concentration (by CEM)               %             8.4
CO  Concentration (by CEM)               %               0
N2  Concentration (by diff.)             %        (  82.90 )
```

```
CALCULATED RESULTS FOR SAMPLE # --  A06251200M17

Isokineticity                               % I       =   101.2
Metered Sample Gas Volume  (scf)            V(m std) =   97.22
                           (scm)            V(m std) =   2.753
Stack Gas Flow, std cond.  (dscfm)          Q(s)      =     546
                std cond.  (dscm/min)       Q(s)      =    15.5
                actual     (acfm)           Q(a)      =    2769
                actual     (acm/min)        Q(a)      =    78.4
Particulate Loading,  dry  (gr/dscf)        C(s std) =  0.0000
                    @ 7% O2(gr/dscf)        C(s std) =  0.0000
                    @ 7% O2(mg/dscm)        C(s std) =       0
Particulate Emission Rate  (lb/hr)          E(p)      =   0.000
                           (kg/hr)          E(p)      =   0.000
--------------------------------------------------------------------
Stack Gas Water Vapor Proportion            B(wo)     =   0.081
Molecular weight of Stack Gas, Dry          M(d)      =   29.69
                               Wet          M(s)      =   28.75
Stack Pressure, absolute (in Hg)            P(s)      =   29.99
Average Stack Velocity (ft/sec)             V(s avg) =    27.1
```

```
---------------------------------------------------------------------
Sample : dClock  :Velocity: Orifice :  Stack  :   Gas  Meter  :SQRT(dP) :FIELD DATA AVERAGES FOR SAMPLE # --  A06251200M17
 Point :  Time   :Head, dP:Meter,dH :  Temp   :  Temp  (degF) :         :
       :  (min)  :(in H2O):(in H2O) : (degF)  :   in   :  out :         :Velocity Head          ("wc)     dP(avg) =  0.050
---------------------------------------------------------------------:
     1 :      25 :   0.05 :     4.4 :    2000 :    170 :   150 :  0.2236 :Orifice Meter Reading  ("wc)     dH(avg) =  4.400
  ---  :---      :---     :---      :---      :---     :---    :---      :
  ---  :---      :---     :---      :---      :---     :---    :---      :Stack Temperature      (deg F)   T(s avg) = 2000.0
  ---  :---      :---     :---      :---      :---     :---    :---      :                       (deg C)   T(s avg) = 1093.3
  ---  :---      :---     :---      :---      :---     :---    :---      :
  ---  :---      :---     :---      :---      :---     :---    :---      :Meter Temperature      (deg F)   T(m avg) =  160.0
  ---  :---      :---     :---      :---      :---     :---    :---      :                       (deg C)   T(m avg) =   71.1
  ---  :---      :---     :---      :---      :---     :---    :---      :
  ---  :---      :---     :---      :---      :---     :---    :---      :Root-Mean-Square dP    ("wc)     SQRT(dP) =  0.224
  ---  :---      :---     :---      :---      :---     :---    :---      :
  ---  :---      :---     :---      :---      :---     :---    :---      :
  ---  :---      :---     :---      :---      :---     :---    :---      :
  ---  :---      :---     :---      :---      :---     :---    :---      :
  ---  :---      :---     :---      :---      :---     :---    :---      :
  ---  :---      :---     :---      :---      :---     :---    :---      :
  ---  :---      :---     :---      :---      :---     :---    :---      :
  ---  :---      :---     :---      :---      :---     :---    :---      :
  ---  :---      :---     :---      :---      :---     :---    :---      :
  ---  :---      :---     :---      :---      :---     :---    :---      :
---------------------------------------------------------------------:
TOTALS :      25 :   0.05 :  4.4000 :  2000.0 :  170.0 : 150.0 :  0.2236 :
```

```
ISOKINETIC RESULTS                                                      CALCULATED RESULTS FOR SAMPLE # --  A08251200M17
Plant:  CRF       Updated  09/06/88  Performed by:      C.KING. G.HILL
Date:   08/25/88  Printed  01/26/89  Test No./Type:     A08251200M17    Isokineticity                              % I        =  108.6
Sample Location:  AFTERBURNER        Start/Stop Time:   1255-1630       Metered Sample Gas Volume  (scf)           V(m std) =  230.48
                                                                                                   (scm)           V(m std) =   6.527
PARAMETER                            SYMBOL    VALUE                    Stack Gas Flow. std cond.  (dscfm)         Q(s)     =     548
                                               (calc.)                                  std cond.  (dscm/min)      Q(s)     =    15.5
Nozzle Diameter. Actual (in)         N(d)        0.75                                   actual     (acfm)          Q(a)     =    2768
Pitot Tube Correction Factor         C(p)        0.84                                   actual     (acm/min)       Q(a)     =    78.4
Gas Meter Correction Factor          (alpha)     0.98                   Particulate Loading.  dry  (gr/dscf)       C(s std) =  0.0000
Stack (Duct) Dimensions (in):                                                             @ 7% O2(gr/dscf)         C(s std) =  0.0000
        Radius (if round)            R                                                    @ 7% O2(mg/dscm)         C(s std) =       0
        Length (if rectangular)      L             20                   Particulate Emission Rate  (lb/hr)         E(p)     =   0.000
        Width (if rectangular)       W          12.25                                              (kg/hr)         E(p)     =   0.000
Area of Stack (sq ft)                A(s)     (1.70138 )                ----------------------------------------------------------------
                                                                        Stack Gas Water Vapor Proportion           B(wo)    =   0.080
# of Sample Points                   #              1                   Molecular Weight of Stack Gas. Dry         M(d)     =   29.69
Total Sampling Time (min)            (theta)  ( 215.00 )                                                Wet        M(s)     =   28.76
Barometric Pressure (in Hg)          P(b)          30                   Stack Pressure. absolute (in Hg)           P(s)     =   29.99
Stack Pressure (in H2O)              P(stack)   -0.08                   Average Stack Velocity (ft/sec)            V(s avg) =    27.1
Gas Meter Initial Reading (cu ft)              1015.4
Gas Meter Final Reading (cu ft)                1290.6
Net Gas Sample Volume (cu ft)        V(m)     ( 275.20 )

Vol of Liquid Collected (ml)         Vl(c)        425
Vol of Liq @ Std. Conds. (scf)       V(w std) ( 20.005 )
Wt. of Filter Particulate (gm)                      0
Wt. of Probe Wash Particulate (gm)                  0
Wt of Combined Particulate (gm)      M(p)     ( 0.0000 )

O2  Concentration (by CEM)           %            8.7
CO2 Concentration (by CEM)           %            8.4
CO  Concentration (by CEM)           %              0
N2  Concentration (by diff.)         %        ( 82.90 )

--------------------------------------------------------------------------
Sample : dClock  :Velocity: Orifice : Stack  :   Gas  Meter  :SQRT(dP) :FIELD DATA AVERAGES FOR SAMPLE # --  A08251200M17
 Point :  Time   :Head. dP:Meter.dH : Temp   :   Temp (degF) :         :
       :  (min)  :(in H2O):(in H2O) : (degF) :   in   :  out :         :Velocity Head            ("wc)     dP(avg)  =  0.050
--------------------------------------------------------------------------:
     1 :     215 :   0.05 :     0.5 :   2000 :    170 :   150 :  0.2236 :Orifice Meter Reading    ("wc)     dH(avg)  =  0.500
 ---     ---     :---     :---      :---     :---     :---    :---      :
 ---    :---     :---     :---      :---     :---     :---    :---      :Stack Temperature        (deg F)   T(s avg) = 2000.0
 ---    :---     :---     :---      :---     :---     :---    :---      :                         (deg C)   T(s avg) = 1093.3
 ---    :---     :---     :---      :---     :---     :---    :---      :
 ---    :---     :---     :---      :---     :---     :---    :---      :Meter Temperature        (deg F)   T(m avg) =  160.0
 ---    :---     :---     :---      :---     :---     :---    :---      :                         (deg C)   T(m avg) =   71.1
 ---    :---     :---     :---      :---     :---     :---    :---      :
 ---    :---     :---     :---      :---     :---     :---    :---      :Root-Mean-Square dP      ("wc)     SQRT(dP) =  0.224
 ---    :---     :---     :---      :---     :---     :---    :---      :
 ---    :---     :---     :---      :---     :---     :---    :---      :
 ---    :---     :---     :---      :---     :---     :---    :---      :
 ---    :---     :---     :---      :---     :---     :---    :---      :
 ---    :---     :---     :---      :---     :---     :---    :---      :
 ---    :---     :---     :---      :---     :---     :---    :---      :
 ---    :---     :---     :---      :---     :---     :---    :---      :
 ---    :---     :---     :---      :---     :---     :---    :---      :
 ---    :---     :---     :---      :---     :---     :---    :---      :
 ---    :---     :---     :---      :---     :---     :---    :---      :
--------------------------------------------------------------------------:
TOTALS :     215 :   0.05 :  0.5000 : 2000.0 :  170.0 : 150.0 :  0.2236 :
```

```
ISOKINETIC RESULTS
Plant:  CRF      Updated  06/28/88  Performed by:     C.KING. G.HILL
Date:   08/25.88 Printed  01/26/89  Test No./Type:    A0825120OM17
S.      Location: AFTERBURNER       Start/Stop Time:  1200-1630

PARAMETER                              SYMBOL    VALUE
                                                 (calc.)
Nozzle Diameter. Actual (in)           N(d)           0
Pitot Tube Correction Factor           C(p)        0.84
Gas Meter Correction Factor            (alpha)     0.93
Stack (Duct) Dimensions (in):
      Radius (if round)                R
      Length (if rectangular)          L             20
      Width (if rectangular)           W          12.25
Area of Stack (sq ft)                  A(s)    (1.70138 )

# of Sample Points                     #              2
Total Sampling Time (min)              (theta)  ( 240.00 )
Barometric Pressure (in Hg)            P(b)          30
Stack Pressure (in H2O)                P(stack)   -0.98
Gas Meter Initial Reading (cu ft)                960.47
Gas Meter Final Reading (cu ft)                  1290.6
Net Gas Sample Volume (cu ft)          V(m)     ( 330.13 )

Vol of Liquid Collected (ml)           Vl(c)     606.38
Vol of Liq @ Std. Cones. (scf)         V(w std) ( 26.542 )
Wt. of Filter Particulate (gm)                    2.881
Wt. of Probe Wash Particulate (gm)                 0.06
Wt    Combined Particulate (gm)        M(p)     ( 2.9410 )

O2  Concentration (by CEM)             %            8.7
CO2 Concentration (by CEM)             %            8.4
CO  Concentration (by CEM)             %              0
N2  Concentration (by diff.)           %        ( 82.90 )


CALCULATED RESULTS FOR SAMPLE # —  A0825120OM17

Isokineticity                                   % I        =      NA
Metered Sample Gas Volume       (scf)           V(m std)   =  328.11
                                (scm)           V(m std)   =   9.291
Stack Gas Flow. std cond.       (dscfm)         Q(s)       =     546
                std cond.       (dscm/min)      Q(s)       =    15.5
                actual          (acfm)          Q(a)       =    2763
                actual          (acm/min)       Q(a)       =    78.4
Particulate Loading.  dry       (gr/dscf)       C(s std)   =  0.1383
                @ 7% O2         (gr/dscf)       C(s std)   =  0.1574
                @ 7% O2         (mg/dscm)       C(s std)   =     360
Particulate Emission Rate       (lb/hr)         E(p)       =   0.650
                                (kg/hr)         E(p)       =   0.295

Stack Gas Water Vapor Proportion                B(wo)      =   0.180
Molecular Weight of Stack Gas. Dry              M(d)       =   29.39
                               Wet              M(s)       =   26.75
Stack Pressure. absolute (in Hg)                P(s)       =   29.93
Average Stack Velocity (ft/sec)                 V(s avg)   =    27.1


Sample : dClock  :Velocity: Orifice : Stack  :   Gas  Meter   :SQRT(dP) :FIELD DATA AVERAGES FOR SAMPLE # —  A0825120OM17
Point  : Time    :Head. dP:Meter.dH : Temp   :   Temp  (degF) :         :
       : (min)   :(in H2O):(in H2O) : (degF) :   in   :  out  :         :Velocity Head           ("wc)     dP(avg)  =   0.050
                                                                        :
     1 :      25 :   0.05 :     4.4 :   2000 :   170  :   150 :  0.2236 :Orifice Meter Reading   ("wc)     dH(avg)  =   2.225
     2 :     215 :   0.05 :    0.05 :   2000 :   170  :   150 :  0.2236 :
 ---   :---      :---     :---      :---     :---     :---    :---      :Stack Temperature       (deg F)   T(s avg) =  2000.0
 ---   :---      :---     :---      :---     :---     :---    :---      :                        (deg C)   T(s avg) =  1093.3
 ---   :---      :---     :---      :---     :---     :---    :---      :
 ---   :---      :---     :---      :---     :---     :---    :---      :Meter Temperature       (deg F)   T(m avg) =   160.0
 ---   :---      :---     :---      :---     :---     :---    :---      :                        (deg C)   T(m avg) =    71.1
 ---   :---      :---     :---      :---     :---     :---    :---      :
 ---   :---      :---     :---      :---     :---     :---    :---      :Root-Mean-Square dP     ("wc)     SQRT(dP) =   0.224
 ---   :---      :---     :---      :---     :---     :---    :---      :
 ---   :---      :---     :---      :---     :---     :---    :---      :
 ---   :---      :---     :---      :---     :---     :---    :---      :
 ---   :---      :---     :---      :---     :---     :---    :---      :
 ---   :---      :---     :---      :---     :---     :---    :---      :
 ---   :---      :---     :---      :---     :---     :---    :---      :
 ---   :---      :---     :---      :---     :---     :---    :---      :
 ---   :---      :---     :---      :---     :---     :---    :---      :
 ---   :---      :---     :---      :---     :---     :---    :---      :

TOTALS :     240 :   0.10 :  4.4500 : 4000.0 :  340.0 : 300.0 :  0.4472 :
```

```
ISOKINETIC RESULTS                                                        CALCULATED RESULTS FOR SAMPLE # ---  E08251211MS
Plant:  CRF        Updated  08/28/88  Performed by:      WES VESTAL
"   ":  08/25/88   Printed  09/19/88  Test No./Type:     E08251211MS      Isokineticity                          % I       =    58.0
  le Location:  SCRUBBER OUTLET       Start/Stop Time:   1211-1543        Metered Sample Gas Volume  (scf)       V(m std)  =  145.68
                                                                                                      (scm)       V(m std)  =   4.125
PARAMETER                                     SYMBOL    VALUE             Stack Gas Flow, std cond.  (dscfm)     Q(s)      =    1100
                                                        (calc.)                           std cond.  (dscm/min)Q(s)        =    31.2
Nozzle Diameter, Actual (in)                  N(d)       0.357                            actual     (acfm)      Q(a)      =    2074
Pitot Tube Correction Factor                  C(p)        0.84                            actual     (acm/min)   Q(a)      =    58.7
Gas Meter Correction Factor                   (alpha)     0.99            Particulate Loading,  dry  (gr/dscf)   C(s std)  =  0.0046
Stack (Duct) Dimensions (in):                                                           @ 7% O2(gr/dscf)     C(s std)  =  0.0073
        Radius (if round)                     R              7                          @ 7% O2(mg/dscm)     C(s std)  =      17
        Length (if rectangular)               L              0            Particulate Emission Rate  (lb/hr)     E(p)      =   0.043
        Width (if rectangular)                W              0                                       (kg/hr)     E(p)      =   0.020
Area of Stack (sq ft)                         A(s)      (1.06901 )        ____________________________________________________________
                                                                          Stack Gas Water Vapor Proportion       B(wo)     =   0.356
# of Sample Points                            #              8            Molecular Weight of Stack Gas, Dry     M(d)      =   29.34
Total Sampling Time (min)                     (theta)   ( 208.00 )                                        Wet    M(s)      =   25.30
Barometric Pressure (in Hg)                   P(b)          30            Stack Pressure, absolute (in Hg)       P(s)      =   29.85
Stack Pressure (in H2O)                       P(stack)      -2            Average Stack Velocity (ft/sec)        V(s avg)  =    32.3
Gas Meter Initial Reading (cu ft)                       964.571
Gas Meter Final Reading (cu ft)                         1125.91
Net Gas Sample Volume (cu ft)                 V(m)      ( 161.34 )

Vol of Liquid Collected (ml)                  Vl(c)      1707.9
Vol of Liq @ Std. Conds. (scf)                V(w std)  ( 80.391 )
Wt. of Filter Particulate (gm)                           0.0332
W   of Probe Wash Particulate (gm)                         0.01
   f Combined Particulate (gm)                M(p)      ( 0.0432 )

O2  Concentration (by CEM)                    %            12.2
CO2 Concentration (by CEM)                    %             5.3
CO  Concentration (by CEM)                    %               0
N2  Concentration (by diff.)                  %         ( 82.50 )
_____________________________________________________________________
Sample ! dClock  !Velocity! Orifice !  Stack  !    Gas  Meter  !SQRT(dP) !FIELD DATA AVERAGES FOR SAMPLE # ---  E08251211MS
 Point !  Time   !Head, dP!Meter,dH !  Temp   !   Temp  (degF) !         !
       !  (min)  !(in H2O)!(in H2O) ! (degF)  !    in   !  out !         !Velocity Head             ("wc)     dP(avg)   =   0.240
-------+---------+--------+---------+---------+---------+------+---------!
     1 !      26 !    0.2 !     1.5 !     180 !     116 !   96 ! 0.4472  !Orifice Meter Reading     ("wc)     dH(avg)   =   1.803
     2 !      26 !    0.2 !     1.5 !     180 !     131 !  110 ! 0.4472  !
     3 !      26 !   0.25 !    1.88 !     180 !     134 !  112 ! 0.5000  !Stack Temperature         (deg F)   T(s avg)  =   180.0
     4 !      26 !   0.26 !    1.95 !     180 !     138 !  117 ! 0.5099  !                          (deg C)   T(s avg)  =    82.2
     1 !      26 !   0.26 !    1.95 !     180 !     138 !  118 ! 0.5099  !
     2 !      26 !   0.25 !    1.88 !     180 !     138 !  118 ! 0.5000  !Meter Temperature         (deg F)   T(m avg)  =   122.8
     3 !      26 !   0.25 !    1.88 !     180 !     139 !  117 ! 0.5000  !                          (deg C)   T(m avg)  =    50.5
     4 !      26 !   0.25 !    1.88 !     180 !     126 !  117 ! 0.5000  !
 ---   !---      !---     !---      !---      !---      !---   !---      !Root-Mean-Square dP       ("wc)     SQRT(dP)  =   0.489
 ---   !---      !---     !---      !---      !---      !---   !---      !
 ---   !---      !---     !---      !---      !---      !---   !---      !
 ---   !---      !---     !---      !---      !---      !---   !---      !
 ---   !---      !---     !---      !---      !---      !---   !---      !
 ---   !---      !---     !---      !---      !---      !---   !---      !
  .    !---      !---     !---      !---      !---      !---   !---      !
  .    !---      !---     !---      !---      !---      !---   !---      !
 ---   !---      !---     !---      !---      !---      !---   !---      !
 ---   !---      !---     !---      !---      !---      !---   !---      !
 ---   !---      !---     !---      !---      !---      !---   !---      !
-------+---------+--------+---------+---------+---------+------+---------!
TOTALS !     208 !   1.92 ! 14.4200 !  1440.0 !  1060.0 ! 905.0 ! 3.9142 !
```

Test 5

```
ISOKINETIC RESULTS                                                      CALCULATED RESULTS FOR SAMPLE # --  S082512580M5
Plant:  CRF          Updated  08/28/88  Performed by:      JOE MILLS
   t    08/25/88     Printed  09/19/88  Test No./Type:     S082512580M5  Isokineticity                          % I        =    99.1
  ,le Location:  STACK                  Start/Stop Time:   1258-1353     Metered Sample Gas Volume   (scf)      V(m std) =   31.94
                                                                                                     (scm)      V(m std) =   0.905
PARAMETER                               SYMBOL    VALUE                  Stack Gas Flow, std cond.   (dscfm)    Q(s)     =     827
                                                  (calc.)                                std cond.   (dscm/min) Q(s)     =    23.4
                                                                                         actual      (acfm)     Q(a)     =    1534
Nozzle Diameter, Actual (in)            N(d)        0.357                                actual      (acm/min)  Q(a)     =    43.4
Pitot Tube Correction Factor            C(p)         0.84                Particulate Loading,  dry   (gr/dscf)  C(s std) =  0.0085
Gas Meter Correction Factor             (alpha)         1                                @ 7% O2     (gr/dscf)  C(s std) =  0.0134
Stack (Duct) Dimensions (in):                                                            @ 7% O2     (mg/dscm)  C(s std) =      31
        Radius (if round)               R               7                Particulate Emission Rate   (lb/hr)    E(p)     =   0.061
        Length (if rectangular)         L               0                                            (kg/hr)    E(p)     =   0.027
        Width (if rectangular)          W               0                ---------------------------------------------------------
Area of Stack (sq ft)                   A(s)    (1.06901 )
                                                                         Stack Gas Water Vapor Proportion       B(wo)    =   0.348
# of Sample Points                      #              12                Molecular Weight of Stack Gas, Dry     M(d)     =   29.35
Total Sampling Time (min)               (theta) (  60.00 )                                              Wet     M(s)     =   25.40
Barometric Pressure (in Hg)             P(b)           30                Stack Pressure, absolute (in Hg)       P(s)     =   29.99
Stack Pressure (in H2O)                 P(stack)    -0.08                Average Stack Velocity (ft/sec)        V(s avg) =    23.9
Gas Meter Initial Reading (cu ft)                   7.368
Gas Meter Final Reading (cu ft)                    42.106
Net Gas Sample Volume (cu ft)           V(m)    (  34.74 )

Vol of Liquid Collected (ml)            Vl(c)      362.66
Vol of Liq @ Std. Conds. (scf)          V(w std) ( 17.070 )
Wt. of Filter Particulate (gm)                     0.0077
Wt. of Probe Wash Particulate (gm)                   0.01
   * Combined Particulate (gm)          M(p)     ( 0.0177 )

O2  Concentration (by CEM)              %            12.1
CO2 Concentration (by CEM)              %             5.4
CO  Concentration (by CEM)              %               0
N2  Concentration (by diff.)            %        (  82.50 )
------------------------------------------------------------------------
Sample ! dClock  !Velocity! Orifice !  Stack  !    Gas  Meter  !SQRT(dP) !FIELD DATA AVERAGES FOR SAMPLE # --  S082512580M5
 Point !  Time   !Head, dP!Meter,dH !  Temp   !    Temp (degF) !         !
       !  (min)  !(in H2O)!(in H2O) ! (degF)  !    in   !  out !         !Velocity Head            ("wc)      dP(avg)  =   0.137
-------+---------+--------+---------+---------+---------+------+---------!
     1 !       5 !   0.11 !   0.836 !     180 !      98 !   97 !  0.3317 !Orifice Meter Reading    ("wc)      dH(avg)  =   1.034
     2 !       5 !    0.2 !     1.5 !     180 !     113 !   98 !  0.4472 !
     3 !       5 !    0.2 !     1.5 !     180 !     123 !   99 !  0.4472 !Stack Temperature        (deg F)    T(s avg) =   180.0
     4 !       5 !   0.25 !     1.9 !     180 !     131 !  102 !  0.5000 !                         (deg C)    T(s avg) =    82.2
     5 !       5 !   0.16 !     1.2 !     180 !     134 !  106 !  0.4000 !
     6 !       5 !   0.06 !    0.46 !     180 !     130 !  109 !  0.2449 !Meter Temperature        (deg F)    T(m avg) =   117.0
     1 !       5 !   0.11 !   0.836 !     180 !     132 !  110 !  0.3317 !                         (deg C)    T(m avg) =    47.2
     2 !       5 !   0.11 !   0.836 !     180 !     134 !  110 !  0.3317 !
     3 !       5 !   0.11 !   0.836 !     180 !     134 !  108 !  0.3317 !Root-Mean-Square dP      ("wc)      SQRT(dP) =   0.363
     4 !       5 !   0.11 !   0.836 !     180 !     134 !  111 !  0.3317 !
     5 !       5 !   0.11 !   0.836 !     180 !     135 !  112 !  0.3317 !
     6 !       5 !   0.11 !   0.836 !     180 !     135 !  113 !  0.3317 !
  --   !       0 !--      !--       !--       !--       !--    !--       !
  --   !       0 !--      !--       !--       !--       !--    !--       !
   -   !       0 !--      !--       !--       !--       !--    !--       !
   -   !--       !--      !--       !--       !--       !--    !--       !
  --   !--       !--      !--       !--       !--       !--    !--       !
  --   !--       !--      !--       !--       !--       !--    !--       !
  --   !--       !--      !--       !--       !--       !--    !--       !
-------+---------+--------+---------+---------+---------+------+---------!
TOTALS !      60 !   1.64 ! 12.4120 !  2160.0 !  1533.0 !1275.0!  4.3610 !
```

Test 7

ISOKINETIC RESULTS
Plant: CRF Updated 09/07/88 Performed by: C. KING & G. HILL
Date: 08/30/88 Printed 09/19/88 Test No./Type: A08301114M17
Sample Location: AFTERBURNER Start/Stop Time: 1114-1431

PARAMETER	SYMBOL	VALUE (calc.)
Nozzle Diameter, Actual (in)	N(d)	1.48
Pitot Tube Correction Factor	C(p)	0.84
Gas Meter Correction Factor	(alpha)	0.98
Stack (Duct) Dimensions (in):		
Radius (if round)	R	—
Length (if rectangular)	L	20
Width (if rectangular)	W	12.25
Area of Stack (sq ft)	A(s)	(1.70138)
# of Sample Points	#	1
Total Sampling Time (min)	(theta)	(197.00)
Barometric Pressure (in Hg)	P(b)	29.65
Stack Pressure (in H2O)	P(stack)	-0.08
Gas Meter Initial Reading (cu ft)		380.5
Gas Meter Final Reading (cu ft)		1235.1
Net Gas Sample Volume (cu ft)	V(m)	(854.60)
Vol of Liquid Collected (ml)	Vl(c)	1233.99
Vol of Liq @ Std. Conds. (scf)	V(w std)	(58.084)
Wt. of Filter Particulate (gm)		0.96
Wt. of Probe Wash Particulate (gm)		1.78
Wt of Combined Particulate (gm)	M(p)	(2.7400)
O2 Concentration (by CEM)	%	7.95
CO2 Concentration (by CEM)	%	8.38
CO Concentration (by CEM)	%	0
N2 Concentration (by diff.)	%	(83.67)

CALCULATED RESULTS FOR SAMPLE # — A0830'114M17

Isokineticity		% I	=	93.9
Metered Sample Gas Volume	(scf)	V(m std)	=	712.67
	(scm)	V(m std)	=	20.181
Stack Gas Flow, std cond.	(dscfm)	Q(s)	=	549
std cond.	(dscm/min)	Q(s)	=	15.6
actual	(acfm)	Q(a)	=	2774
actual	(acm/min)	Q(a)	=	78.6
Particulate Loading, dry	(gr/dscf)	C(s std)	=	0.0593
@ 7% O2	(gr/dscf)	C(s std)	=	0.0636
@ 7% O2	(mg/dscm)	C(s std)	=	146
Particulate Emission Rate	(lb/hr)	E(p)	=	0.279
	(kg/hr)	E(p)	=	0.127
Stack Gas Water Vapor Proportion		B(wo)	=	0.075
Molecular Weight of Stack Gas, Dry		M(d)	=	29.66
Wet		M(s)	=	28.78
Stack Pressure, absolute (in Hg)		P(s)	=	29.64
Average Stack Velocity (ft/sec)		V(s avg)	=	27.2

Sample Point	dClock Time (min)	Velocity Head, dP (in H2O)	Orifice Meter, dH (in H2O)	Stack Temp (degF)	Gas Meter Temp (degF) in	Gas Meter Temp (degF) out	SQRT(dP)
1	197	0.05	4.4	2000	170	161	0.2236
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
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—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
TOTALS	197	0.05	4.4000	2000.0	170.0	161.0	0.2236

FIELD DATA AVERAGES FOR SAMPLE # — A08301114M17

Velocity Head	("wc)	dP(avg)	=	0.050
Orifice Meter Reading	("wc)	dH(avg)	=	4.400
Stack Temperature	(deg F)	T(s avg)	=	2000.0
	(deg C)	T(s avg)	=	1093.3
Meter Temperature	(deg F)	T(m avg)	=	165.5
	(deg C)	T(m avg)	=	74.2
Root-Mean-Square dP	("wc)	SQRT(dP)	=	0.224

```
ISOKINETIC RESULTS                                                  CALCULATED RESULTS FOR SAMPLE # --  E0830111785
  ant: CRF        Updated  09/05/88  Performed by:     WES VESTAL
uate:   08/30/88  Printed  09/19/88  Test No./Type:    E0830111785  Isokineticity        :                 % I       =   106.2
Sample Location:  SCRUBBER OUTLET    Start/Stop Time:  1117-1354    Metered Sample Gas Volume  (scf)        V(m std) =  121.29
                                                                                               (scm)_____ V(m std)_=_   3.491
PARAMETER                          SYMBOL    VALUE                  Stack Gas Flow, std cond.  (dscfm)      Q(s)     =    1175
                                             (calc.)                               std cond.  (dscm/min) Q(s)_ _ =    33.3
                                                                                   actual     (acfm)       Q(a)     =    2392
Nozzle Diameter, Actual (in)       N(d)      0.357                                 actual     (acm/min)    Q(a)     =    67.7
Pitot Tube Correction Factor       C(p)      0.84                   Particulate Loading,  dry (gr/dscf)  C(s std) = 0.0062
Gas Meter Correction Factor        (alpha)   0.99                                  @ 7% O2(gr/dscf)  C(s std) = 0.0100
Stack (Duct) Dimensions (in):                                                      @ 7% O2(mg/dscm)  C(s std) =      23
        Radius (if round)          R             7                  Particulate Emission Rate  (lb/hr)  E(p)     =   0.062
        Length (if rectangular)    L         ---                                               (kg/hr)  E(p)     =   0.028
        Width (if rectangular)     W         ---                    ____________________________________________________
Area of Stack (sq ft)              A(s)      (1.06901 )
                                                                    Stack Gas Water Vapor Proportion      B(wo)    =   0.400
# of Sample Points                 #             8                  Molecular Weight of Stack Gas, Dry    M(d)     =   29.69
Total Sampling Time (min)          (theta)   ( 152.00 )                                            Wet    M(s)     =   25.01
Barometric Pressure (in Hg)        P(b)      29.85                  Stack Pressure, absolute (in Hg)      P(s)     =   29.70
Stack Pressure (in H2O)            P(stack)     -2                  Average Stack Velocity (ft/sec)       V(s avg) =    37.3
Gas Meter Initial Reading (cu ft)            126.437
Gas Meter Final Reading (cu ft)              259.353
Net Gas Sample Volume (cu ft)      V(m)      ( 132.92 )

Vol of Liquid Collected (ml)       Vl(c)     1746.25
Vol of Liq @ Std. Conds. (scf)     V(w std)  ( 82.196 )
 `. of Filter Particulate (gm)               0.0495
 .. of Probe Wash Particulate (gm)              0
Wt of Combined Particulate (gm)    M(p)      ( 0.0495 )

O2  Concentration (by CEM)         %         12.34
CO2 Concentration (by CEM)         %          7.47
CO  Concentration (by CEM)         %             0
N2  Concentration (by diff.)       %         ( 80.19 )
_____________________________________________________________
Sample : dClock  :Velocity: Orifice :  Stack  :    Gas  Meter  :SQRT(dP) :FIELD DATA AVERAGES FOR SAMPLE # --  E0830111785
 Point :  Time   :Head, dP:Meter,dH :  Temp   :   Temp  (degF) :         :
       :  (min)  :(in H2O):(in H2O) : (degF)  :    in   :  out :         :Velocity Head            ("wc)     dP(avg)  =   0.314
-------+---------+--------+---------+---------+---------+------+---------:
     1 :      19 :   0.25 :    1.95 :     180 :      86 :   78 :  0.5000 :Orifice Meter Reading    ("wc)     dH(avg)  =   2.435
     2 :      19 :    0.3 :    2.34 :     180 :     114 :   85 :  0.5477 :
     3 :      19 :   0.33 :    2.57 :     180 :     123 :   98 :  0.5745 :Stack Temperature        (deg F)   T(s avg) =   180.0
     4 :      19 :    0.3 :    2.34 :     180 :     125 :   99 :  0.5477 :                         (deg C)   T(s avg) =    82.2
     1 :      19 :   0.33 :    2.57 :     180 :      97 :   94 :  0.5745 :
     2 :      19 :   0.33 :    2.57 :     180 :     128 :  101 :  0.5745 :Meter Temperature        (deg F)   T(m avg) =   105.4
     3 :      19 :   0.33 :    2.57 :     180 :     126 :  102 :  0.5745 :                         (deg C)   T(m avg) =    40.8
     4 :      19 :   0.34 :    2.57 :     180 :     127 :  103 :  0.5831 :
   --- :---      :---     :---      :---      :---      :---   :---      :Root-Mean-Square dP      ("wc)     SQRT(dP) =   0.560
   --- :---      :---     :---      :---      :---      :---   :---      :
   --- :---      :---     :---      :---      :---      :---   :---      :
   --- :---      :---     :---      :---      :---      :---   :---      :
   --- :---      :---     :---      :---      :---      :---   :---      :
     - :---      :---     :---      :---      :---      :---   :---      :
   --- :---      :---     :---      :---      :---      :---   :---      :
   --- :---      :---     :---      :---      :---      :---   :---      :
   --- :---      :---     :---      :---      :---      :---   :---      :
   --- :---      :---     :---      :---      :---      :---   :---      :
   --- :---      :---     :---      :---      :---      :---   :---      :
-------+---------+--------+---------+---------+---------+------+---------:
TOTALS :     152 :   2.51 : 19.4800 :  1440.0 :   926.0 : 760.0 :  4.4764 :
```

```
ISOKINETIC RESULTS
Plant:  CRF        Updated  09/05/88  Performed by:       ABE & JOE
Date:   08/30/88   Printed  09/19/88  Test No./Type:      90830113RM5
Sample Location:   STACK              Start/Stop Time:    1130-1238

PARAMETER                             SYMBOL     VALUE
                                                 (calc.)

Nozzle Diameter, Actual (in)          N(d)        0.357
Pitot Tube Correction Factor          C(p)         0.84
Gas Meter Correction Factor           (alpha)         1
Stack (Duct) Dimensions (in):
        Radius (if round)             R               7
        Length (if rectangular)       L               0
        Width (if rectangular)        W               0
Area of Stack (sq ft)                 A(s)     (1.06901 )

# of Sample Points                    #              12
Total Sampling Time (min)             (theta)  (  60.00 )
Barometric Pressure (in Hg)           P(b)        29.85
Stack Pressure (in H2O)               P(stack)    -0.08
Gas Meter Initial Reading (cu ft)                42.695
Gas Meter Final Reading (cu ft)                  80.441
Net Gas Sample Volume (cu ft)         V(m)     (  37.75 )

Vol of Liquid Collected (ml)          Vl(c)      405.38
Vol of Liq @ Std. Conds. (scf)        V(w std) ( 19.081 )
Wt. of Filter Particulate (gm)                   0.0082
  . of Probe Wash Particulate (gm)                 0.01
wt of Combined Particulate (gm)       M(p)     ( 0.0182 )

O2  Concentration (by CEM)            %            12.4
CO2 Concentration (by CEM)            %            7.38
CO  Concentration (by CEM)            %               0
N2  Concentration (by diff.)          %        (  80.22 )
```

```
CALCULATED RESULTS FOR SAMPLE # ---  90830113RM5

Isokineticity                                 % I        =   101.5
Metered Sample Gas Volume        (scf)        V(m std) =     25.80
                                 (scm)        V(m std) =     1.014
Stack Gas Flow, std cond.        (dscfm)      Q(s)     =       905
                std cond.        (dscm/min)   Q(s)     =      25.6
                actual           (acfm)       Q(a)     =      1666
                actual           (acm/min)    Q(a)     =      47.7
Particulate Loading,  dry        (gr/dscf)    C(s std) =    0.0078
                  @ 7% O2        (gr/dscf)    C(s std) =    0.0128
                  @ 7% O2        (mg/dscm)    C(s std) =        29
Particulate Emission Rate        (lb/hr)      E(p)     =     0.061
                                 (kg/hr)      E(p)     =     0.028
__________________________________________________________________

Stack Gas Water Vapor Proportion              B(wo)    =     0.348
Moleculer Weight of Stack Gas, Dry            M(d)     =     29.68
                               Wet            M(s)     =     25.62
Stack Pressure, absolute (in Hg)              P(s)     =     29.84
Average Stack Velocity (ft/sec)               V(s avg) =      26.3
```

```
Sample : dClock  :Velocity: Orifice :  Stack  :    Gas  Meter    :SQRT(dP) :FIELD DATA AVERAGES FOR SAMPLE # ---  90830113RM5
 Point :  Time   :Head, dP:Meter,dH :  Temp   :    Temp  (degF)  :         :
       :  (min)  :(in H2O):(in H2O) : (degF)  :    in   :  out   :         :Velocity Head            ("wc)     dP(avg)  =   0.160
-------+---------+--------+---------+---------+---------+--------+---------:
     1 :       5 :   0.16 :    1.25 :     180 :      82 :     76 :  0.4000 :Orifice Meter Reading    ("wc)     dH(avg)  =   1.250
     2 :       5 :   0.16 :    1.25 :     180 :      82 :     76 :  0.4000 :
     3 :       5 :   0.16 :    1.25 :     180 :      82 :     76 :  0.4000 :Stack Temperature        (deg F)   T(s avg) =   180.0
     4 :       5 :   0.16 :    1.25 :     180 :     110 :     81 :  0.4000 :                         (deg C)   T(s avg) =    82.2
     5 :       5 :   0.16 :    1.25 :     180 :     114 :     84 :  0.4000 :
     6 :       5 :   0.16 :    1.25 :     180 :     116 :     86 :  0.4000 :Meter Temperature        (deg F)   T(m avg) =    97.0
     1 :       5 :   0.16 :    1.25 :     180 :     117 :     88 :  0.4000 :                         (deg C)   T(m avg) =    36.1
     2 :       5 :   0.16 :    1.25 :     180 :     118 :     90 :  0.4000 :
     3 :       5 :   0.16 :    1.25 :     180 :     119 :     91 :  0.4000 :Root-Mean-Square dP      ("wc)     SQRT(dP) =   0.400
     4 :       5 :   0.16 :    1.25 :     180 :     119 :     92 :  0.4000 :
     5 :       5 :   0.16 :    1.25 :     180 :     120 :     94 :  0.4000 :
     6 :       5 :   0.16 :    1.25 :     180 :     120 :     94 :  0.4000 :
  ---  :---      :---     :---      :---      :---      :---     :---      :
    -  :---      :---     :---      :---      :---      :---     :---      :
    -  :---      :---     :---      :---      :---      :---     :---      :
  ---  :---      :---     :---      :---      :---      :---     :---      :
  ---  :---      :---     :---      :---      :---      :---     :---      :
  ---  :---      :---     :---      :---      :---      :---     :---      :
  ---  :---      :---     :---      :---      :---      :---     :---      :
-------+---------+--------+---------+---------+---------+--------+---------:
TOTALS :      60 :   1.92 : 15.0000 :  2160.0 :  1299.0 : 1028.0 :  4.8000 :
```

```
ISOKINETIC RESULTS
'ant:  CRF          Updated  09/07/88  Performed by:      C KING
ate:   09/07/88  Printed  09/19/88  Test No./Type:     A09071129M17
Sample Location:  AFTERBURNER          Start/Stop Time:   1129-1529

PARAMETER                                   SYMBOL    VALUE
                                                      (calc.)

Nozzle Diameter, Actual (in)                N(d)         1.45
Pitot Tube Correction Factor                C(p)         0.84
Gas Meter Correction Factor                 (alpha)      0.98
Stack (Duct) Dimensions (in):
       Radius (if round)                    R            ——
       Length (if rectangular)              L              20
       Width (if rectangular)               W           12.25
Area of Stack (sq ft)                       A(s)     (1.70138 )

# of Sample Points                          #               1
Total Sampling Time (min)                   (theta)  ( 205.00 )
Barometric Pressure (in Hg)                 P(b)           30
Stack Pressure (in H2O)                     P(stack)    -0.08
Gas Meter Initial Reading (cu ft)                     235.125
Gas Meter Final Reading (cu ft)                        1036.6
Net Gas Sample Volume (cu ft)               V(m)     ( 801.47 )

Vol of Liquid Collected (ml)                Vl(c)        1250
Vol of Liq @ Std. Conds. (scf)              V(w std) ( 58.838 )
 't. of Filter Particulate (gm)                         1.031
  . of Probe Wash Particulate (gm)                       0.03
Wt of Combined Particulate (gm)             m(p)     ( 1.0610 )

O2  Concentration (by CEM)                  %             5.6
CO2 Concentration (by CEM)                  %              10
CO  Concentration (by CEM)                  %               0
N2  Concentration (by diff.)                %        ( 84.40 )
```

```
CALCULATED RESULTS FOR SAMPLE # —— A09071129M17

Isokineticity                                      % I       =    90.7
Metered Sample Gas Volume        (scf)             V(m std) =  677.81
                                 (scm)             V(m std) =  19.194
Stack Gas Flow, std cond.        (dscfm)           Q(s)     =     541
                std cond.        (dscm/min)        Q(s)     =    15.3
                actual           (acfm)            Q(a)     =    2957
                actual           (acm/min)         Q(a)     =    83.7
Particulate Loading,  dry        (gr/dscf)         C(s std) =  0.0242
                      @ 7% O2    (gr/dscf)         C(s std) =  0.0220
                      @ 7% O2    (mg/dscm)         C(s std) =      50
Particulate Emission Rate        (lb/hr)           E(p)     =   0.112
                                 (kg/hr)           E(p)     =   0.051
--------------------------------------------------------------------------
Stack Gas Water Vapor Proportion                   B(wo)    =   0.080
Molecular Weight of Stack Gas, Dry                 M(d)     =   29.62
                               Wet                 M(s)     =   28.68
Stack Pressure, absolute (in Hg)                   P(s)     =   29.99
Average Stack Velocity (ft/sec)                    V(s avg) =    29.0
```

```
Sample ! dClock  !Velocity! Orifice !  Stack  !    Gas  Meter    !SQRT(dP)
 Point !  Time   !Head, dP!Meter,dH !  Temp   !   Temp  (degF)   !
       !  (min)  !(in H2O)!(in H2O) ! (degF)  !    in   !  out   !
-------+---------+--------+---------+---------+---------+--------+--------
     1 !     205 ! 0.053  !     4.5 !    2200 !     170 !    150 ! 0.2302
  ——   !——       !——      !——       !——       !——       !——      !——
  ——   !——       !——      !——       !——       !——       !——      !——
  ——   !——       !——      !——       !——       !——       !——      !——
  ——   !——       !——      !——       !——       !——       !——      !——
  ——   !——       !——      !——       !——       !——       !——      !——
  ——   !——       !——      !——       !——       !——       !——      !——
  ——   !——       !——      !——       !——       !——       !——      !——
  ——   !——       !——      !——       !——       !——       !——      !——
  ——   !——       !——      !——       !——       !——       !——      !——
  ——   !——       !——      !——       !——       !——       !——      !——
  ——   !——       !——      !——       !——       !——       !——      !——
  ——   !——       !——      !——       !——       !——       !——      !——
   -   !——       !——      !——       !——       !——       !——      !——
   -   !——       !——      !——       !——       !——       !——      !——
  ——   !——       !——      !——       !——       !——       !——      !——
  ——   !——       !——      !——       !——       !——       !——      !——
  ——   !——       !——      !——       !——       !——       !——      !——
  ——   !——       !——      !——       !——       !——       !——      !——
-------+---------+--------+---------+---------+---------+--------+--------
TTLS !       205 !   0.05 !  4.5000 !  2200.0 !   170.0 !  150.0 ! 0.2302 !
```

```
!FIELD DATA AVERAGES FOR SAMPLE # —— A09071129M17
!
!Velocity Head                (" wc)      dP(avg)   =   0.053
!
!Orifice Meter Reading        (" wc)      dH(avg)   =   4.500
!
!Stack Temperature            (deg F)     T(s avg)  =  2200.0
                              (deg C)     T(s avg)  =  1204.4
!
!
!Meter Temperature            (deg F)     T(m avg)  =   160.0
                              (deg C)     T(m avg)  =    71.1
!
!
!Root-Mean-Square dP          (" wc)      SQRT(dP)  =   0.230
```

```
ISOKINETIC RESULTS
 'ant:  CAF        Updated  09/07/88  Performed by:      W. VESTAL
 ate:   09/07/88   Printed  09/19/88  Test No./Type:     E09071157
Sample Location:   SCRUBBER OUTLET    Start/Stop Time:   1157-1417

                                          SYMBOL    VALUE
PARAMETER                                           (calc.)

Nozzle Diameter, Actual (in)              N(d)       0.357
Pitot Tube Correction Factor              C(p)       0.84
Gas Meter Correction Factor               (alpha)    0.99
Stack (Duct) Dimensions (in):
        Radius (if round)                 R             7
        Length (if rectangular)           L          ——
        Width (if rectangular)            W          ——
Area of Stack (sq ft)                     A(s)      (1.06901 )

# of Sample Points                        #             8
Total Sampling Time (min)                 (theta)   ( 136.00 )
Barometric Pressure (in Hg)               P(b)         30
Stack Pressure (in H2O)                   P(stack)     -2
Gas Meter Initial Reading (cu ft)                  261.511
Gas Meter Final Reading (cu ft)                    383.422
Net Gas Sample Volume (cu ft)             V(m)      ( 121.91 )

Vol of Liquid Collected (ml)              Vl(c)     1180.98
Vol of Liq @ Std. Conds. (scf)            V(w std)  ( 55.589 )
'*. of Filter Particulate (gm)                       0.0645
 . of Probe Wash Particulate (gm)                         0
Wt of Combined Particulate (gm)           M(p)      ( 0.0645 )

O2  Concentration (by CEM)                %            14
CO2 Concentration (by CEM)                %           6.4
CO  Concentration (by CEM)                %             0
N2  Concentration (by diff.)              %         ( 79.60 )
```

```
CALCULATED RESULTS FOR SAMPLE # —  E09071157

                                                  % I        =    53.7
Isokineticity
Metered Sample Gas Volume    (scf)               V(m std) =  113.42
                             (scm)               V(m std) =   3.212
Stack Gas Flow, std cond.    (dscfm)             Q(s)     =    1370
                std cond.    (dscm/min)          Q(s)     =    38.8
                actual       (acfm)              Q(a)     =    2480
                actual       (acm/min)           Q(a)     =    70.2
Particulate Loading,  dry    (gr/dscf)           C(s std) =  0.0088
                      @ 7% O2(gr/dscf)           C(s std) =  0.0176
                      @ 7% O2(mg/dscm)           C(s std) =      40
Particulate Emission Rate    (lb/hr)             E(p)     =   0.103
                             (kg/hr)             E(p)     =   0.047
______________________________________________________________________
Stack Gas Water Vapor Proportion                 B(wo)    =   0.329
Molecular Weight of Stack Gas, Dry               M(d)     =   29.56
                               Wet               M(s)     =   25.77
                                                 P(s)     =   29.85
Stack Pressure, absolute (in Hg)
Average Stack Velocity (ft/sec)                  V(s avg) =    38.7
```

```
Sample : dClock  :Velocity: Orifice :  Stack  :    Gas  Meter   :SQRT(dP) :FIELD DATA AVERAGES FOR SAMPLE # —  E09071157
 Point :  Time   :Head, dP:Meter,dH :  Temp   :    Temp  (degF) :         :
       :  (min)  :(in H2O):(in H2O) :  (degF) :    in   :  out  :         :Velocity Head          ("wc)     dP(avg)  =   0.349
                                                                          :
                                                                          :Orifice Meter Reading ("wc)     dH(avg)  =   2.790
     1 :      17 :   0.34 :    2.72 :     180 :    105  :    80 :  0.5831 :
     2 :      17 :   0.34 :    2.72 :     180 :    118  :    90 :  0.5831 :
     3 :      17 :   0.37 :    2.96 :     180 :    120  :    94 :  0.6083 :Stack Temperature     (deg F)   T(s avg) =   180.0
     4 :      17 :   0.37 :    2.96 :     180 :    121  :    96 :  0.6083 :                      (deg C)   T(s avg) =    82.2
     4 :      17 :   0.37 :    2.96 :     180 :    121  :    97 :  0.6083 :
     3 :      17 :   0.34 :    2.72 :     180 :    123  :    98 :  0.5831 :Meter Temperature     (deg F)   T(m avg) =   107.0
     2 :      17 :   0.33 :    2.64 :     180 :    124  :   100 :  0.5745 :                      (deg C)   T(m avg) =    41.7
     1 :      17 :   0.33 :    2.64 :     180 :    124  :   101 :  0.5745 :
   —— :——      :——      :——       :——       :——       :——     :——       :Root-Mean-Square dP   ("wc)     SQRT(dP) =   0.590
   —— :——      :——      :——       :——       :——       :——     :——       :
   —— :——      :——      :——       :——       :——       :——     :——       :
   —— :——      :——      :——       :——       :——       :——     :——       :
   —— :——      :——      :——       :——       :——       :——     :——       :
   —— :——      :——      :——       :——       :——       :——     :——       :
      :——      :——      :——       :——       :——       :——     :——       :
   —— :——      :——      :——       :——       :——       :——     :——       :
   —— :——      :——      :——       :——       :——       :——     :——       :
   —— :——      :——      :——       :——       :——       :——     :——       :
   —— :——      :——      :——       :——       :——       :——     :——       :
   —— :——      :——      :——       :——       :——       :——     :——       :

TOTALS :     136 :   2.79 : 22.3200 :  1440.0 :  956.0  : 756.0 :  4.7230 :
```

Test 8

```
ISOKINETIC RESULTS
 lant:  CRF        Updated  09/07/88  Performed by:      G.HILL
Date:   09/07/88   Printed  09/19/88  Test No./Type:     90907115595
Sample Location:   STACK              Start/Stop Time:   1155-1300

PARAMETER                                 SYMBOL     VALUE
                                                     (calc.)

Nozzle Diameter, Actual (in)              N(d)        0.375
Pitot Tube Correction Factor              C(p)         0.84
Gas Meter Correction Factor               (alpha)         1
Stack (Duct) Dimensions (in):
        Radius (if round)                 R               7
        Length (if rectangular)           L          ____
        Width (if rectangular)            W          ____
Area of Stack (sq ft)                     A(s)      (1.06901 )

# of Sample Points                        #              12
Total Sampling Time (min)                 (theta)   (  60.00 )
Barometric Pressure (in Hg)               P(b)           30
Stack Pressure (in H2O)                   P(stack)    -0.08
Gas Meter Initial Reading (cu ft)                    80.804
Gas Meter Final Reading (cu ft)                     119.077
Net Gas Sample Volume (cu ft)             V(m)      (  38.27 )

Vol of Liquid Collected (ml)              Vl(c)       506.7
Vol of Liq @ Std. Conds. (scf)            V(w std)  ( 23.850 )
Wt. of Filter Particulate (gm)                       0.0208
 .. of Probe Wash Particulate (gm)                        0
Wt of Combined Particulate (gm)           M(p)      ( 0.0208 )

O2  Concentration (by CEM)                %              14
CO2 Concentration (by CEM)                %             6.4
CO  Concentration (by CEM)                %               0
N2  Concentration (by diff.)              %         (  79.60 )
```

```
CALCULATED RESULTS FOR SAMPLE # --  90907115595

Isokineticity                                  % I         =    97.3
Metered Sample Gas Volume  (scf)               V(m std) =       36.63
                           (scm)               V(m std) =       1.037
Stack Gas Flow, std cond.  (dscfm)             Q(s)        =     875
                std cond.  (dscm/min)Q(s)                  =    24.8
                actual     (acfm)              Q(a)        =    1725
                actual     (acm/min)           Q(a)        =    48.8
Particulate Loading,  dry  (gr/dscf)           C(s std) =     0.0088
                 @ 7% O2(gr/dscf)              C(s std) =     0.0175
                 @ 7% O2(mg/dscm)              C(s std) =         40
Particulate Emission Rate  (lb/hr)             E(p)        =   0.066
                           (kg/hr)             E(p)        =   0.030
______________________________________________________________________

Stack Gas Water Vapor Proportion               B(wo)       =   0.394
Molecular Weight of Stack Gas, Dry             M(d)        =   29.58
                               Wet             M(s)        =   25.02
Stack Pressure, absolute (in Hg)               P(s)        =   29.99
Average Stack Velocity (ft/sec)                V(s avg) =       26.9
```

```
___________________________________________________________________________
Sample : dClock  :Velocity: Orifice :  Stack  :    Gas  Meter   :SQRT(dP) :FIELD DATA AVERAGES FOR SAMPLE # --  90907115595
 Point :  Time   :Head, dP:Meter,dH :  Temp   :   Temp  (degF)  :         :
       :  (min)  :(in H2O):(in H2O) : (degF)  :    in   :  out  :         :Velocity Head           ("wc)     dP(avg)  =   0.167
_______:_________:________:_________:_________:_________:_______:_________:
     1 :       5 :   0.13 :    1.02 :     172 :      75 :    72 :  0.3606 :Orifice Meter Reading   ("wc)     dH(avg)  =   1.304
     2 :       5 :   0.17 :    1.33 :     172 :      82 :    72 :  0.4123 :
     3 :       5 :   0.17 :    1.33 :     172 :      99 :    74 :  0.4123 :Stack Temperature       (deg F)   T(s avg) =   172.0
     4 :       5 :   0.17 :    1.33 :     172 :     106 :    76 :  0.4123 :                        (deg C)   T(s avg) =    77.8
     5 :       5 :   0.17 :    1.33 :     172 :     110 :    79 :  0.4123 :
     6 :       5 :   0.17 :    1.33 :     172 :     113 :    82 :  0.4123 :Meter Temperature       (deg F)   T(m avg) =    94.7
     6 :       5 :   0.17 :    1.33 :     172 :     116 :    85 :  0.4123 :                        (deg C)   T(m avg) =    34.8
     5 :       5 :   0.17 :    1.33 :     172 :     117 :    86 :  0.4123 :
     4 :       5 :   0.17 :    1.33 :     172 :     118 :    87 :  0.4123 :Root-Mean-Square dP    ("wc)     SQRT(dP) =   0.408
     3 :       5 :   0.17 :    1.33 :     172 :     118 :    89 :  0.4123 :
     2 :       5 :   0.17 :    1.33 :     172 :     118 :    90 :  0.4123 :
     1 :       5 :   0.17 :    1.33 :     172 :     118 :    90 :  0.4123 :
  ____ :____     :____    :____     :____     :____     :____   :____     :
     - :____     :____    :____     :____     :____     :____   :____     :
   ___ :____     :____    :____     :____     :____     :____   :____     :
  ____ :____     :____    :____     :____     :____     :____   :____     :
  ____ :____     :____    :____     :____     :____     :____   :____     :
  ____ :____     :____    :____     :____     :____     :____   :____     :
  ____ :____     :____    :____     :____     :____     :____   :____     :
___________________________________________________________________________:
TOTALS :      60 :   2.00 : 15.6500 :  2064.0 :  1290.0 : 982.0 :  4.8960 :
```

Test 9

```
ISOKINETIC RESULTS                                                   CALCULATED RESULTS FOR SAMPLE # --- A09091129M17
Plant: CRF        Updated 09/07/88  Performed by:     C.KING
      09/09/88   Printed 09/24/88  Test No./Type:    A09091129M17   Isokineticity                              % I        =    95.5
Sample Location: AFTERBURNER        Start/Stop Time:  1129-1529      Metered Sample Gas Volume  (scf)          V(m std) =  872.34
                                                                                                (scm)          V(m std) =  24.702
PARAMETER                           SYMBOL     VALUE                 Stack Gas Flow, std cond.  (dscfm)        Q(s)     =     565
                                               (calc.)                               std cond.  (dscm/min)Q(s)     =    16.0
                                                                                     actual     (acfm)         Q(a)     =    2757
Nozzle Diameter, Actual (in)        N(d)         1.45                                actual     (acm/min)      Q(a)     =    78.1
Pitot Tube Correction Factor        C(p)         0.84                Particulate Loading,  dry  (gr/dscf)      C(s std) =  0.0589
Gas Meter Correction Factor         (alpha)      0.98                              @ 7% O2(gr/dscf)            C(s std) =  0.0665
Stack (Duct) Dimensions (in):                                                      @ 7% O2(mg/dscm)            C(s std) =     152
      Radius (if round)             R            ----                Particulate Emission Rate  (lb/hr)        E(m)     =   0.285
      Length (if rectangular)       L              20                                           (kg/hr)        E(p)     =   0.129
      Width (if rectangular)        W           12.25                ______________________________________________________________
Area of Stack (sq ft)               A(s)     (1.70138 )
                                                                     Stack Gas Water Vapor Proportion          B(wo)    =   0.043
# of Sample Points                  #               1                Molecular Weight of Stack Gas, Dry        M(d)     =   29.62
Total Sampling Time (min)           (theta)  ( 240.00 )                                             Wet        M(s)     =   29.12
Barometric Pressure (in Hg)         P(b)        29.87                Stack Pressure, absolute (in Hg)          P(s)     =   29.86
Stack Pressure (in H2O)             P(stack)    -0.08                Average Stack Velocity (ft/sec)           V(s avg) =    27.0
Gas Meter Initial Reading (cu ft)               37.12
Gas Meter Final Reading (cu ft)               1084.17
Net Gas Sample Volume (cu ft)       V(m)     (1047.05 )

Vol of Liquid Collected (ml)        Vl(c)      834.21
Vol of Liq @ Std. Conds. (scf)      V(w std) ( 39.266 )
Wt. of Filter Particulate (gm)                  1.368
W  of Probe Wash Particulate (gm)                1.56
      Combined Particulate (gm)     M(p)     ( 3.3280 )

O2  Concentration (by CEM)          %             8.6
CO2 Concentration (by CEM)          %               8
CO  Concentration (by CEM)          %               0
N2  Concentration (by diff.)        %        (  83.40 )
_____________________________________________________________________
Sample : dClock  :Velocity: Orifice :  Stack  :    Gas  Meter   :SQRT(dP) :FIELD DATA AVERAGES FOR SAMPLE # -- A09091129M17
 Point :  Time   :Head, dP:Meter,dH :  Temp   :   Temp  (degF)  :         :
       :  (min)  :(in H2O):(in H2O) : (degF)  :    in   :  out  :         :Velocity Head          ("wc)     dP(avg)  =   0.050
_____________________________________________________________________:
     1 :     240 :   0.05 :     4.4 :    2000 :     170 :   163 :  0.2236 :Orifice Meter Reading  ("wc)     dH(avg)  =   4.400
     0 :----     :----    :----     :----     :----     :----   :----     :
  ----  :----     :----    :----     :----     :----     :----   :----     :Stack Temperature      (deg F)   T(s avg) =  2000.0
  ----  :----     :----    :----     :----     :----     :----   :----     :                       (deg C)   T(s avg) =  1093.3
  ----  :----     :----    :----     :----     :----     :----   :----     :
  ----  :----     :----    :----     :----     :----     :----   :----     :
  ----  :----     :----    :----     :----     :----     :----   :----     :Meter Temperature      (deg F)   T(m avg) =   166.5
  ----  :----     :----    :----     :----     :----     :----   :----     :                       (deg C)   T(m avg) =    74.7
  ----  :----     :----    :----     :----     :----     :----   :----     :
  ----  :----     :----    :----     :----     :----     :----   :----     :
  ----  :----     :----    :----     :----     :----     :----   :----     :Root-Mean-Square dP    ("wc)     SQRT(dP) =   0.224
  ----  :----     :----    :----     :----     :----     :----   :----     :
  ----  :----     :----    :----     :----     :----     :----   :----     :
  ----  :----     :----    :----     :----     :----     :----   :----     :
  -     :----     :----    :----     :----     :----     :----   :----     :
  -     :----     :----    :----     :----     :----     :----   :----     :
  ----  :----     :----    :----     :----     :----     :----   :----     :
  ----  :----     :----    :----     :----     :----     :----   :----     :
  ----  :----     :----    :----     :----     :----     :----   :----     :
_____________________________________________________________________:
TOTALS :     240 :   0.05 :  4.4000 :  2000.0 :   170.0 : 163.0 :  0.2236 :
```

```
ISOKINETIC RESULTS
Plant:  CRF        Updated  09/07/88  Performed by:     M.VESTAL
Date:   09/09/88   Printed  09/19/88  Test No./Type:    E09091126M5
Sample Location:   SCRUBBER OUTLET    Start/Stop Time:  1126-1359

PARAMETER                              SYMBOL     VALUE
                                                  (calc.)

Nozzle Diameter, Actual (in)           N(d)        0.357
Pitot Tube Correction Factor           C(p)        0.84
Gas Meter Correction Factor            (alpha)     0.97
Stack (Duct) Dimensions (in):
        Radius (if round)              R               7
        Length (if rectangular)        L          ——
        Width (if rectangular)         W          ——
Area of Stack (sq ft)                  A(s)      (1.06901 )

# of Sample Points                     #               8
Total Sampling Time (min)              (theta)   ( 152.00 )
Barometric Pressure (in Hg)            P(b)       29.87
Stack Pressure (in H2O)                P(stack)       -2
Gas Meter Initial Reading (cu ft)                384.11
Gas Meter Final Reading (cu ft)                  505.213
Net Gas Sample Volume (cu ft)          V(m)      ( 121.10 )

Vol of Liquid Collected (ml)           Vl(c)     1339.16
Vol of Liq @ Std. Conds. (scf)         V(w std)  ( 63.034 )
 . of Filter Particulate (gm)                     0.0228
 . of Probe Wash Particulate (gm)                      0
Wt of Combined Particulate (gm)        M(n)      ( 0.0228 )

O2  Concentration (by CEM)             %          12.68
CO2 Concentration (by CEM)             %           5.55
CO  Concentration (by CEM)             %              0
N2  Concentration (by diff.)           %         (  81.77 )
```

```
CALCULATED RESULTS FOR SAMPLE # —— E09091126M5

Isokineticity                                   % I        =   101.3
Metered Sample Gas Volume    (scf)              V(m std) =   111.09
                             (scm)              V(m std) =    3.146
Stack Gas Flow, std cond.    (dscfm)            Q(s)       =    1110
                std cond.    (dscm/min)         Q(s)       =    31.4
                actual       (acfm)             Q(a)       =    2056
                actual       (acm/min)          Q(a)       =    58.4
Particulate Loading,  dry    (gr/dscf)          C(s std) =   0.0032
                  @ 7% O2    (gr/dscf)          C(s std) =   0.0053
                  @ 7% O2    (mg/dscm)          C(s std) =       12
Particulate Emission Rate    (lb/hr)            E(p)       =   0.030
                             (kg/hr)            E(p)       =   0.014
____________________________________________________________________
Stack Gas Water Vapor Proportion                B(wo)      =   0.362
Molecular Weight of Stack Gas, Dry              M(d)       =   29.40
                               Wet              M(s)       =   25.27
Stack Pressure, absolute (in Hg)                P(s)       =   29.72
Average Stack Velocity (ft/sec)                 V(s avg) =     32.7
```

```
_______________________________________________________________________________
Sample : dClock  :Velocity: Orifice : Stack  :   Gas  Meter  :SQRT(dP) :FIELD DATA AVERAGES FOR SAMPLE # —— E09091126M5
 Point :  Time   :Head, dP:Meter,dH : Temp   :  Temp  (degF) :         :
       :  (min)  :(in H2O):(in H2O) : (degF) :   in   :  out :         :Velocity Head           ("wc)     dP(avg)  =   0.246
_______________________________________________________________________________:
     1 :      19 :   0.25 :       2 :    172 :    87 :    86 :  0.5000 :Orifice Meter Reading   ("wc)     dH(avg)  =   1.970
     2 :      19 :   0.25 :       2 :    172 :   125 :    98 :  0.5000 :
     3 :      19 :   0.25 :       2 :    172 :   127 :   104 :  0.5000 :Stack Temperature       (deg F)   T(s avg) =   172.0
     4 :      19 :   0.22 :    1.76 :    172 :   127 :   105 :  0.4690 :                        (deg C)   T(s avg) =    77.8
     1 :      19 :   0.25 :       2 :    172 :   108 :   102 :  0.5000 :
     2 :      19 :   0.25 :       2 :    172 :   130 :   108 :  0.5000 :Meter Temperature       (deg F)   T(m avg) =   111.4
     3 :      19 :   0.25 :       2 :    172 :   130 :   109 :  0.5000 :                        (deg C)   T(m avg) =    44.1
     4 :      19 :   0.25 :       2 :    172 :   129 :   108 :  0.5000 :
  ——   :——       :——      :——       :——      :——     :——     :——       :Root-Mean-Square dP     ("wc)     SQRT(dP) =   0.496
  ——   :——       :——      :——       :——      :——     :——     :——       :
  ——   :——       :——      :——       :——      :——     :——     :——       :
  ——   :——       :——      :——       :——      :——     :——     :——       :
  ——   :——       :——      :——       :——      :——     :——     :——       :
   -   :——       :——      :——       :——      :——     :——     :——       :
  ——   :——       :——      :——       :——      :——     :——     :——       :
  ——   :——       :——      :——       :——      :——     :——     :——       :
  ——   :——       :——      :——       :——      :——     :——     :——       :
  ——   :——       :——      :——       :——      :——     :——     :——       :
  ——   :——       :——      :——       :——      :——     :——     :——       :
_______________________________________________________________________________:
TOTALS :  [illegible]
```

```
SOKINETIC RESULTS
 lant:  CRF        Updated  09/07/88  Performed by:     J.MILLS
Date:   09/09/88   Printed  09/19/88  Test No./Type:    S0909114SRS
Sample Location:   STACK              Start/Stop Time:  1145-1245

PARAMETER                                 SYMBOL    VALUE
                                                    (calc.)

Nozzle Diameter, Actual (in)              N(d)       0.357
Pitot Tube Correction Factor              C(p)        0.84
Gas Meter Correction Factor               (alpha)        1
Stack (Duct) Dimensions (in):
       Radius (if round)                  R              7
       Length (if rectangular)            L         ——
       Width (if rectangular)             W         ——
Area of Stack (sq ft)                     A(s)     (1.06901 )

# of Sample Points                        #             12
Total Sampling Time (min)                 (theta)  (  60.00 )
Barometric Pressure (in Hg)               P(b)       29.87
Stack Pressure (in H2O)                   P(stack)   -0.08
Gas Meter Initial Reading (cu ft)                   770.931
Gas Meter Final Reading (cu ft)                     806.925
Net Gas Sample Volume (cu ft)             V(m)     (  35.99 )

Vol of Liquid Collected (ml)              Vl(c)      419.39
Vol of Liq @ Std. Conds. (scf)            V(w std) ( 19.741 )
 :. of Filter Particulate (gm)                       0.0085
 t. of Probe Wash Particulate (gm)                     0.01
Wt of Combined Particulate (gm)           M(p)     ( 0.0185 )

O2  Concentration (by CEM)                %          12.68
CO2 Concentration (by CEM)                %           5.55
CO  Concentration (by CEM)                %              0
N2  Concentration (by diff.)              %        ( 81.77 )
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CALCULATED RESULTS FOR SAMPLE # —— S0909114SRS

Isokineticity                                  % I       =   103.1
Metered Sample Gas Volume   (scf)              V(m std)  =   33.81
                            (scm)              V(m std)  =   0.957
Stack Gas Flow, std cond.   (dscfm)            Q(s)      =     841
                std cond.   (dscm/min)Q(s)               =    23.8
                actual      (acfm)             Q(a)      =    1597
                actual      (acm/min)          Q(a)      =    45.2
Particulate Loading,   dry  (gr/dscf)          C(s std)  =  0.0084
                     @ 7% O2(gr/dscf)          C(s std)  =  0.0142
                     @ 7% O2(mg/dscm)          C(s std)  =      33
Particulate Emission Rate   (lb/hr)            E(p)      =   0.061
                            (kg/hr)            E(p)      =   0.028
______________________________________________________________________

Stack Gas Water Vapor Proportion               B(wo)     =   0.369
Molecular Weight of Stack Gas, Dry             M(d)      =   29.40
                               Wet             M(s)      =   25.19
Stack Pressure, absolute (in Hg)               P(s)      =   29.86
Average Stack Velocity (ft/sec)                V(s avg)  =    24.9
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______________________________________________________________________
Sample ! dClock  !Velocity! Orifice !  Stack  !   Gas  Meter   !SQRT(dP) !FIELD DATA AVERAGES FOR SAMPLE # —  S0909114SRS
 Point !  Time   !Head, dP!Meter,dH !  Temp   !   Temp  (degF) !         !
       !  (min)  !(in H2O)!(in H2O) ! (degF)  !   in   !  out  !         !Velocity Head          ("wc)    dP(avg)  =  0.143
___________________________________________________________________________!
     1 !       5 !   0.13 !     1.1 !     172 !     95 !     83 ! 0.3606 !Orifice Meter Reading  ("wc)    dH(avg)  =  1.157
     2 !       5 !   0.13 !     1.1 !     172 !     97 !     83 ! 0.3606 !
     3 !       5 !   0.13 !     1.1 !     172 !    104 !     84 ! 0.3606 !Stack Temperature      (deg F)  T(s avg) =  172.0
     4 !       5 !   0.13 !     1.1 !     172 !    110 !     86 ! 0.3606 !                       (deg C)  T(s avg) =   77.8
     5 !       5 !   0.15 !     1.2 !     172 !    116 !     89 ! 0.3873 !
     6 !       5 !   0.15 !     1.2 !     172 !    117 !     91 ! 0.3873 !Meter Temperature      (deg F)  T(m avg) =  102.5
     1 !       5 !   0.15 !     1.2 !     172 !    118 !     92 ! 0.3873 !                       (deg C)  T(m avg) =   39.2
     2 !       5 !   0.15 !     1.2 !     172 !    120 !     95 ! 0.3873 !
     3 !       5 !   0.15 !     1.2 !     172 !    121 !     97 ! 0.3873 !Root-Mean-Square dP    ("wc)    SQRT(dP) =  0.378
     4 !       5 !   0.15 !     1.2 !     172 !    122 !     98 ! 0.3873 !
     5 !       5 !   0.15 !     1.2 !     172 !    122 !     99 ! 0.3873 !
     6 !       5 !   0.15 !     1.2 !     172 !    122 !    100 ! 0.3873 !
  ——   !——       !——      !——       !——       !——      !——     !——      !
   -   !——       !——      !——       !——       !——      !——     !——      !
  ——   !——       !——      !——       !——       !——      !——     !——      !
  ——   !——       !——      !——       !——       !——      !——     !——      !
  ——   !——       !——      !——       !——       !——      !——     !——      !
  ——   !——       !——      !——       !——       !——      !——     !——      !
  ——   !——       !——      !——       !——       !——      !——     !——      !
___________________________________________________________________________!
TOTALS !      60 ! [illegible]
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ISOKINETIC RESULTS
  nt:  CRF          Updated  ——          Performed by:       C KING
   :   09-14-88     Printed  09/20/88    Test No./Type:      A09140929
Sample Location:  AFTERBURNER            Start/Stop Time:    0928-1500

PARAMETER                                SYMBOL    VALUE
                                                   (calc.)

Nozzle Diameter, Actual (in)             N(d)         1.45
Pitot Tube Correction Factor             C(p)         0.84
Gas Meter Correction Factor              (alpha)      0.98
Stack (Duct) Dimensions (in):
        Radius (if round)                R           ——
        Length (if rectangular)          L              20
        Width (if rectangular)           W           12.25
Area of Stack (sq ft)                    A(s)     (1.70138 )

# of Sample Points                       #               1
Total Sampling Time (min)                (theta)  ( 232.00 )
Barometric Pressure (in Hg)              P(b)           30
Stack Pressure (in H2O)                  P(stack)    -0.08
Gas Meter Initial Reading (cu ft)                  1089.49
Gas Meter Final Reading (cu ft)                    2121.49
Net Gas Sample Volume (cu ft)            V(m)     (1032.00 )

Vol of Liquid Collected (ml)             Vl(c)        1425
Vol of Liq @ Std. Conds. (scf)           V(w std) ( 67.075 )
Wt. of Filter Particulate (gm)                       0.568
    of Probe Wash Particulate (gm)                    5.98
 .. of Combined Particulate (gm)         M(p)     ( 6.5480 )

O2  Concentration (by CEM)               %            7.23
CO2 Concentration (by CEM)               %             8.8
CO  Concentration (by CEM)               %               0
N2  Concentration (by diff.)             %        ( 83.97 )
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CALCULATED RESULTS FOR SAMPLE # —— A09140929

Isokineticity                               % I        =   102.0
Metered Sample Gas Volume    (scf)          V(m std) = 861.44
                             (scm)          V(m std) =  24.394
Stack Gas Flow, std cond.    (dscfm)        Q(s)     =     541
                std cond.    (dscm/min)     Q(s)     =    15.3
                actual       (acfm)         Q(a)     =    2708
                actual       (acm/min)      Q(a)     =    76.7
Particulate Loading,  dry    (gr/dscf)      C(s std) =  0.1173
                  @ 7% O2(gr/dscf)          C(s std) =  0.1192
                  @ 7% O2(mg/dscm)          C(s std) =     273
Particulate Emission Rate    (lb/hr)        E(p)     =   0.543
                             (kg/hr)        E(p)     =   0.246
______________________________________________________________

Stack Gas Water Vapor Proportion            B(wo)    =   0.072
Molecular Weight of Stack Gas, Dry          M(d)     =   29.70
                               Wet          M(s)     =   28.85
Stack Pressure, absolute (in Hg)            P(s)     =   29.99
Average Stack Velocity (ft/sec)             V(s avg) =    26.5
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---------------------------------------------------------------------------
Sample : dClock  :Velocity: Orifice  :  Stack  :    Gas  Meter   :SQRT(dP) :FIELD DATA AVERAGES FOR SAMPLE # —— A09140928
 Point :  Time   :Head, dP:Meter,dH  :  Temp   :   Temp  (degF)  :         :
       :  (min)  :(in H2O):(in H2O)  : (degF)  :    in   :  out  :         :Velocity Head            ("wc)     dP(avg)  =  0.048
---------------------------------------------------------------------------:
     1 :     232 :  0.048 :      4.4 :    2000 :     172 :    164 :  0.2191 :Orifice Meter Reading    ("wc)     dH(avg)  =  4.400
 ——    :——       :——      :——        :——       :——       :——      :——       :
 ——    :——       :——      :——        :——       :——       :——      :——       :Stack Temperature        (deg F)   T(s avg) = 2000.0
 ——    :——       :——      :——        :——       :——       :——      :——       :                         (deg C)   T(s avg) = 1093.3
 ——    :——       :——      :——        :——       :——       :——      :——       :
 ——    :——       :——      :——        :——       :——       :——      :——       :Meter Temperature        (deg F)   T(m avg) =  168.0
 ——    :——       :——      :——        :——       :——       :——      :——       :                         (deg C)   T(m avg) =   75.6
 ——    :——       :——      :——        :——       :——       :——      :——       :
 ——    :——       :——      :——        :——       :——       :——      :——       :Root-Mean-Square dP      ("wc)     SQRT(dP) =  0.219
 ——    :——       :——      :——        :——       :——       :——      :——       :
 ——    :——       :——      :——        :——       :——       :——      :——       :
 ——    :——       :——      :——        :——       :——       :——      :——       :
 ——    :——       :——      :——        :——       :——       :——      :——       :
 ——    :——       :——      :——        :——       :——       :——      :——       :
       :——       :——      :——        :——       :——       :——      :——       :
 ——    :——       :——      :——        :——       :——       :——      :——       :
 ——    :——       :——      :——        :——       :——       :——      :——       :
 ——    :——       :——      :——        :——       :——       :——      :——       :
 ——    :——       :——      :——        :——       :——       :——      :——       :
---------------------------------------------------------------------------:
TOTALS :     232 :   0.05 :   4.4000 :  2000.0 :   172.0 :  164.0 :  0.2191 :
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Test 4

ISOKINETIC RESULTS

nt: CRF	Updated 09/07/88	Performed by:	W. VESTAL
e: 09-14-88	Printed 09/20/88	Test No./Type:	E0914093295
Sample Location:	SCRUBBER OUTLET	Start/Stop Time:	0932-1409

PARAMETER	SYMBOL	VALUE (calc.)
Nozzle Diameter, Actual (in)	N(d)	0.375
Pitot Tube Correction Factor	C(p)	0.84
Gas Meter Correction Factor	(alpha)	0.99
Stack (Duct) Dimensions (in):		
Radius (if round)	R	7
Length (if rectangular)	L	—
Width (if rectangular)	W	—
Area of Stack (sq ft)	A(s)	(1.06901)
# of Sample Points	#	9
Total Sampling Time (min)	(theta)	(168.00)
Barometric Pressure (in Hg)	P(b)	30
Stack Pressure (in H2O)	P(stack)	-2
Gas Meter Initial Reading (cu ft)		505.79
Gas Meter Final Reading (cu ft)		646.518
Net Gas Sample Volume (cu ft)	V(m)	(140.73)
Vol of Liquid Collected (ml)	Vl(c)	1847.18
Vol of Liq @ Std. Conds. (scf)	V(w std)	(86.947)
Wt. of Filter Particulate (gm)		0.0061
of Probe Wash Particulate (gm)		0.01
of Combined Particulate (gm)	M(p)	(0.0161)
O2 Concentration (by CEM)	%	11.9
CO2 Concentration (by CEM)	%	5.2
CO Concentration (by CEM)	%	0
N2 Concentration (by diff.)	%	(82.90)

CALCULATED RESULTS FOR SAMPLE # — E0914093295

Isokineticity		% I =	100.4
Metered Sample Gas Volume	(scf)	V(m std) =	129.69
	(scm)	V(m std) =	3.673
Stack Gas Flow, std cond.	(dscfm)	Q(s) =	1072
std cond.	(dscm/min)	Q(s) =	30.4
actual	(acfm)	Q(a) =	2149
actual	(acm/min)	Q(a) =	60.9
Particulate Loading, dry	(gr/dscf)	C(s std) =	0.0019
@ 7% O2	(gr/dscf)	C(s std) =	0.0029
@ 7% O2	(mg/dscm)	C(s std) =	7
Particulate Emission Rate	(lb/hr)	E(p) =	0.018
	(kg/hr)	E(p) =	0.008

Stack Gas Water Vapor Proportion	B(wo) =	0.401
Molecular Weight of Stack Gas, Dry	M(d) =	29.31
Wet	M(s) =	24.77
Stack Pressure, absolute (in Hg)	P(s) =	29.85
Average Stack Velocity (ft/sec)	V(s avg) =	33.5

Sample Point	dClock Time (min)	Velocity Head, dP (in H2O)	Orifice Meter, dH (in H2O)	Stack Temp (degF)	Gas Meter Temp (degF) in	Gas Meter Temp (degF) out	SQRT(dP)
1	21	0.25	2.08	172	91	82	0.5000
2	7	0.3	2.49	172	121	92	0.5477
2	14	0.29	2.41	172	102	93	0.5385
3	21	0.3	2.49	172	124	97	0.5477
4	21	0.22	1.84	172	133	105	0.4690
1	21	0.24	1.99	172	128	108	0.4899
2	21	0.24	1.99	172	134	109	0.4899
3	21	0.23	1.91	172	134	109	0.4796
4	21	0.23	1.91	172	134	110	0.4796
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
TOTALS	168	2.30	19.1100	1548.0	1101.0	905.0	4.5420

FIELD DATA AVERAGES FOR SAMPLE # — E0914093295

Velocity Head	("wc)	dP(avg) =	0.256
Orifice Meter Reading	("wc)	dH(avg) =	2.123
Stack Temperature	(deg F)	T(s avg) =	172.0
	(deg C)	T(s avg) =	77.8
Meter Temperature	(deg F)	T(m avg) =	111.4
	(deg C)	T(m avg) =	44.1
Root-Mean-Square dP	("wc)	SQRT(dP) =	0.505

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ISOKINETIC RESULTS
  nt:  CRF         Updated  09/07/88  Performed by:       J.MILLS
   #:  09-14-88    Printed  09/20/88  Test No./Type:      90914120BMS
Sample Location:   STACK              Start/Stop Time:    1208-1308

PARAMETER                                   SYMBOL      VALUE
                                                        (calc.)
Nozzle Diameter, Actual (in)                N(d)        0.357
Pitot Tube Correction Factor                C(p)        0.84
Gas Meter Correction Factor                 (alpha)     1
Stack (Duct) Dimensions (in):
        Radius (if round)                   R           7
        Length (if rectangular)             L           ___
        Width (if rectangular)              W           ___
Area of Stack (sq ft)                       A(s)        (1.06901 )

# of Sample Points                          #           12
Total Sampling Time (min)                   (theta)     (  60.00 )
Barometric Pressure (in Hg)                 P(b)        30
Stack Pressure (in H2O)                     P(stack)    -0.08
Gas Meter Initial Reading (cu ft)                       807.164
Gas Meter Final Reading (cu ft)                         841.412
Net Gas Sample Volume (cu ft)               V(m)        (  34.25 )

Vol of Liquid Collected (ml)                Vl(c)       414.75
Vol of Liq @ Std. Concs. (scf)              V(w std)    ( 13.522 )
Wt. of Filter Particulate (gm)                          0.0059
    of Probe Wash Particulate (gm)                      0.02
.. of Combined Particulate (gm)             M(p)        ( 0.0259 )

O2  Concentration (by CEM)                  %           11.9
CO2 Concentration (by CEM)                  %           5.2
CO  Concentration (by CEM)                  %           0
N2  Concentration (by diff.)                %           ( 82.90 )
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CALCULATED RESULTS FOR SAMPLE # ---  90914120BMS

Isokineticity                                % I          =   103.3
Metered Sample Gas Volume     (scf)          V(m std)     =   32.06
                              (scm)          V(m std)     =   0.908
Stack Gas Flow, std cond.     (dscfm)        Q(s)         =   796
                std cond.     (dscm/min)     Q(s)         =   22.5
                actual        (acfm)         Q(a)         =   1519
                actual        (acm/min)      Q(a)         =   43.0
Particulate Loading,   dry    (gr/dscf)      C(s std)     =   0.0125
                 @ 7% O2      (gr/dscf)      C(s std)     =   0.0192
                 @ 7% O2      (mg/dscm)      C(s std)     =   44
Particulate Emission Rate     (lb/hr)        E(p)         =   0.085
                              (kg/hr)        E(p)         =   0.039
__________________________________________________________________

Stack Gas Water Vapor Proportion             B(wo)        =   0.379
Molecular Weight of Stack Gas, Dry           M(d)         =   29.31
                               Wet           M(s)         =   25.03
Stack Pressure, absolute (in Hg)             P(s)         =   29.99
Average Stack Velocity (ft/sec)              V(s avg)     =   23.7
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_______________________________________________________________________________
Sample : dClock :Velocity: Orifice :  Stack  :    Gas   Meter   :SQRT(dP)
 Point :  Time  :Head, dP:Meter,dH :  Temp   :    Temp  (degF)  :
       :  (min) :(in H2O):(in H2O) : (degF)  :    in   :  out   :
_______________________________________________________________________________
     1 :      5 :   0.13 :     1.1 :     168 :      91 :     88 : 0.3606
     2 :      5 :   0.13 :     1.1 :     168 :     103 :     88 : 0.3606
     3 :      5 :   0.13 :     1.1 :     168 :     111 :     90 : 0.3606
     4 :      5 :   0.13 :     1.1 :     168 :     116 :     92 : 0.3606
     5 :      5 :   0.13 :     1.1 :     168 :     119 :     93 : 0.3606
     6 :      5 :   0.13 :     1.1 :     168 :     121 :     97 : 0.3606
     1 :      5 :   0.13 :     1.1 :     168 :     123 :     98 : 0.3606
     2 :      5 :   0.13 :     1.1 :     168 :     124 :    100 : 0.3606
     3 :      5 :   0.13 :     1.1 :     168 :     124 :    101 : 0.3606
     4 :      5 :   0.13 :     1.1 :     168 :     125 :    103 : 0.3606
     5 :      5 :   0.13 :     1.1 :     168 :     125 :    104 : 0.3606
     6 :      5 :   0.13 :     1.1 :     168 :     125 :    105 : 0.3606
   ___ :___     :___     :___      :___      :___      :      0 :___
   ___ :___     :___     :___      :___      :___      :___     :___
   ___ :___     :___     :___      :___      :___      :___     :___
       :___     :___     :___      :___      :___      :___     :___
   ___ :___     :___     :___      :___      :___      :___     :___
   ___ :___     :___     :___      :___      :___      :___     :___
   ___ :___     :___     :___      :___      :___      :___     :___
   ___ :___     :___     :___      :___      :___      :___     :___
_______________________________________________________________________________
TOTALS :     60 :   1.56 : 13.2000 :  2016.0 :  1407.0 : 1159.0 : 4.3267 :
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:FIELD DATA AVERAGES FOR SAMPLE # ---  90914120BMS
:
:Velocity Head                ("wc)       dP(avg)    =   0.130
:
:Orifice Meter Reading        ("wc)       dH(avg)    =   1.100
:
:Stack Temperature            (deg F)     T(s avg)   =   168.0
:                             (deg C)     T(s avg)   =   75.6
:
:Meter Temperature            (deg F)     T(m avg)   =   106.9
:                             (deg C)     T(m avg)   =   41.6
:
:Root-Mean-Square dP          ("wc)       SQRT(dP)   =   0.361
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Test 6

ISOKINETIC RESULTS

nt: CRF Updated —— Performed by: C KING
#: 09-16-88 Printed 09/23/88 Test No./Type: A09161110
Sample Location: AFTERBURNER Start/Stop Time: 1110-1525

PARAMETER	SYMBOL	VALUE (calc.)
Nozzle Diameter, Actual (in)	N(d)	1.25
Pitot Tube Correction Factor	C(p)	0.84
Gas Meter Correction Factor	(alpha)	0.98
Stack (Duct) Dimensions (in):		
Radius (if round)	R	——
Length (if rectangular)	L	20
Width (if rectangular)	W	12.25
Area of Stack (sq ft)	A(s)	(1.70138)
# of Sample Points	#	1
Total Sampling Time (min)	(theta)	(235.00)
Barometric Pressure (in Hg)	P(b)	30
Stack Pressure (in H2O)	P(stack)	-0.08
Gas Meter Initial Reading (cu ft)		130.423
Gas Meter Final Reading (cu ft)		953.124
Net Gas Sample Volume (cu ft)	V(m)	(822.70)
Vol of Liquid Collected (ml)	V(lc)	1201
Vol of Liq @ Std. Conds. (scf)	V(w std)	(56.531)
Wt. of Filter Particulate (gm)		0.446
of Probe Wash Particulate (gm)		2.38
Wt. of Combined Particulate (gm)	M(p)	(2.8260)
O2 Concentration (by CEM)	%	8.5
CO2 Concentration (by CEM)	%	7.9
CO Concentration (by CEM)	%	0
N2 Concentration (by diff.)	%	(83.60)

CALCULATED RESULTS FOR SAMPLE # — A09161110

Isokineticity		% I	=	106.6
Metered Sample Gas Volume	(scf)	V(m std)	=	685.48
	(scm)	V(m std)	=	19.524
Stack Gas Flow, std cond.	(dscfm)	Q(s)	=	540
std cond.	(dscm/min)	Q(s)	=	15.3
actual	(acfm)	Q(a)	=	2714
actual	(acm/min)	Q(a)	=	76.9
Particulate Loading, dry	(gr/dscf)	C(s std)	=	0.0633
@ 7% O2	(gr/dscf)	C(s std)	=	0.0709
@ 7% O2	(mg/dscm)	C(s std)	=	162
Particulate Emission Rate	(lb/hr)	E(p)	=	0.293
	(kg/hr)	E(p)	=	0.133
Stack Gas Water Vapor Proportion		B(wo)	=	0.076
Molecular Weight of Stack Gas, Dry		M(d)	=	29.60
Wet		M(s)	=	28.72
Stack Pressure, absolute (in Hg)		P(s)	=	29.99
Average Stack Velocity (ft/sec)		V(s avg)	=	26.6

Sample Point	dClock Time (min)	Velocity Head, dP (in H2O)	Orifice Meter, dH (in H2O)	Stack Temp (degF)	Gas Meter Temp (degF) in	Gas Meter Temp (degF) out	SQRT(dP)
1	235	0.048	4.4	2000	171	160	0.2191
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
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—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
TOTALS	235	0.05	4.4000	2000.0	171.0	160.0	0.2191

FIELD DATA AVERAGES FOR SAMPLE # — A09161110

Velocity Head	("wc)	dP(avg)	=	0.048
Orifice Meter Reading	("wc)	dH(avg)	=	4.460
Stack Temperature	(deg F)	T(s avg)	=	2000.0
	(deg C)	T(s avg)	=	1093.3
Meter Temperature	(deg F)	T(m avg)	=	165.5
	(deg C)	T(m avg)	=	74.2
Root-Mean-Square dP	("wc)	SQRT(dP)	=	0.219

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ISOKINETIC RESULTS
~-nt:  CRF        Updated  09/07/88  Performed by:       W.VESTAL
  #:   09-16-88   Printed  09/20/88  Test No./Type:      E0916111995
Sample Location:  SCRUBBER OUTLET    Start/Stop Time:    1119-1355

PARAMETER                               SYMBOL      VALUE
                                                    (calc.)

Nozzle Diameter, Actual (in)            N(d)        0.375
Pitot Tube Correction Factor            C(p)        0.84
Gas Meter Correction Factor             (alpha)     0.99
Stack (Duct) Dimensions (in):
        Radius (if round)               R              7
        Length (if rectangular)         L           ——
        Width (if rectangular)          W           ——
Area of Stack (sq ft)                   A(s)        (1.06901 )

# of Sample Points                       #              8
Total Sampling Time (min)               (theta)     ( 152.00 )
Barometric Pressure (in Hg)             P(b)        29.95
Stack Pressure (in H2O)                 P(stack)       -2
Gas Meter Initial Reading (cu ft)                   647.075
Gas Meter Final Reading (cu ft)                     781.943
Net Gas Sample Volume (cu ft)           V(m)        ( 134.87 )

Vol of Liquid Collected (ml)            Vl(c)       1732.96
Vol of Liq @ Std. Conds. (scf)          V(w std)    ( 81.570 )
Wt. of Filter Particulate (gm)                      0.0508
   of Probe Wash Particulate (gm)                   0.02
 . of Combined Particulate (gm)         M(p)        ( 0.0708 )

O2  Concentration (by CEM)              %              12
CO2 Concentration (by CEM)              %            5.55
CO  Concentration (by CEM)              %               0
N2  Concentration (by diff.)            %           ( 82.45 )
```

```
CALCULATED RESULTS FOR SAMPLE # —— E0916111995

Isokineticity                                  % I        =   56.7
Metered Sample Gas Volume     (scf)            V(m std) =   125.90
                              (scm)            V(m std) =   3.565
Stack Gas Flow, std cond.     (dscfm)          Q(s)       =   1195
                std cond.     (dscm/min)Q(s)              =   33.8
                actual        (acfm)           Q(a)       =   2366
                actual        (acm/min)        Q(a)       =   67.0
Particulate Loading,  dry     (gr/dscf)        C(s std) =   0.0067
                @ 7% O2(gr/dscf)               C(s std) =   0.0135
                @ 7% O2(mg/dscm)               C(s std) =      31
Particulate Emission Rate     (lb/hr)          E(p)       =   0.089
                              (kg/hr)          E(p)       =   0.040
______________________________________________________________________

Stack Gas Water Vapor Proportion               B(wo)      =   0.393
Molecular Weight of Stack Gas, Dry             M(d)       =   29.37
                               Wet             M(s)       =   24.90
Stack Pressure, absolute (in Hg)               P(s)       =   29.80
Average Stack Velocity (ft/sec)                V(s avg) =     36.9
```

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_______________________________________________________________________________
Sample : dClock  !Velocity! Orifice :  Stack  :    Gas  Meter   !SQRT(dP) !FIELD DATA AVERAGES FOR SAMPLE # —  E0916111995
 Point :  Time   !Head, dP!Meter,dH :  Temp   :   Temp  (degF)  :         !
       :  (min)  !(in H2O)!(in H2O) : (degF)  :    in   :  out  :         !Velocity Head            ("wc)      dP(avg)  =   0.310
-------+---------+--------+---------+---------+---------+-------+---------!
     1 :      19 :   0.32 :    2.56 :     172 :      78 :    77 :  0.5657 !Orifice Meter Reading    ("wc)      dH(avg)  =   2.480
     2 :      19 :   0.32 :    2.56 :     172 :     117 :    85 :  0.5657 !
     3 :      19 :   0.32 :    2.56 :     172 :     127 :    92 :  0.5657 !Stack Temperature        (deg F)    T(s avg) =   172.0
     4 :      19 :   0.32 :    2.56 :     172 :     108 :    92 :  0.5657 !                         (deg C)    T(s avg) =    77.8
     1 :      19 :    0.3 :     2.4 :     172 :     119 :    96 :  0.5477 !
     2 :      19 :    0.3 :     2.4 :     172 :     126 :    97 :  0.5477 !Meter Temperature        (deg F)    T(m avg) =   103.7
     3 :      19 :    0.3 :     2.4 :     172 :     125 :    97 :  0.5477 !                         (deg C)    T(m avg) =    39.8
     4 :      19 :    0.3 :     2.4 :     172 :     126 :    97 :  0.5477 !
     0 :       0 :      0 :       0 :       0 :       0 :     0 :  0.0000 !Root-Mean-Square dP      ("wc)      SQRT(dP) =   0.557
 ——    !——       !——      !——       !——       !——       !——     !——       !
 ——    !——       !——      !——       !——       !——       !——     !——       !
 ——    !——       !——      !——       !——       !——       !——     !——       !
 ——    !——       !——      !——       !——       !——       !——     !——       !
 ——    !——       !——      !——       !——       !——       !——     !——       !
       !——       !——      !——       !——       !——       !——     !——       !
 ——    !——       !——      !——       !——       !——       !——     !——       !
 ——    !——       !——      !——       !——       !——       !——     !——       !
 ——    !——       !——      !——       !——       !——       !——     !——       !
 ——    !——       !——      !——       !——       !——       !——     !——       !
-------+---------+--------+---------+---------+---------+-------+---------!
TOTALS :     152 :   2.48 : 19.8400 :  1376.0 :   926.0 : 733.0 :  4.4536 !
```

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ISOKINETIC RESULTS
  nt:  CRF         Updated  9/21/88   Performed by:      G.HILL
  .e:  9/16/88     Printed  09/23/88  Test No./Type:     S0916112SM5
Sample Location:   STACK                 Start/Stop Time:   1125-1233

PARAMETER                                SYMBOL    VALUE
                                                   (calc.)

Nozzle Diameter, Actual (in)             N(d)        0.357
Pitot Tube Correction Factor             C(p)        0.84
Gas Meter Correction Factor              (alpha)        1
Stack (Duct) Dimensions (in):
        Radius (if round)                R              7
        Length (if rectangular)          L          ——
        Width (if rectangular)           W          ——
Area of Stack (sq ft)                    A(s)      (1.06901 )

# of Sample Points                       #             12
Total Sampling Time (min)                (theta)  (  60.00 )
Barometric Pressure (in Hg)              P(b)        29.95
Stack Pressure (in H2O)                  P(stack)    -0.08
Gas Meter Initial Reading (cu ft)                   841.547
Gas Meter Final Reading (cu ft)                     894.613
Net Gas Sample Volume (cu ft)            V(m)     (  53.07 )

Vol of Liquid Collected (ml)             Vl(c)      660.3
Vol of Liq @ Std. Conds. (scf)           Vw std) ( 31.080 )
Wt. of Filter Particulate (gm)                       0.0147
    of Probe Wash Particulate (gm)                   0.01
Wt of Combined Particulate (gm)          M(p)     ( 0.0247 )

O2  Concentration (by CEM)               %              12
CO2 Concentration (by CEM)               %            5.55
CO  Concentration (by CEM)               %               0
N2  Concentration (by diff.)             %        (  82.45 )
```

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CALCULATED RESULTS FOR SAMPLE # —  S0916112SM5

Isokineticity                              % I          =  103.6
Metered Sample Gas Volume    (scf)         V(m std) =   50.11
                             (scm)         V(m std) =   1.419
Stack Gas Flow, std cond.    (dscfm)       Q(s)        =   1241
                std cond.    (dscm/min)Q(s)            =   35.1
                actual       (acfm)        Q(a)        =   2362
                actual       (acm/min)     G(a)        =   67.4
Particulate Loading,  dry    (gr/dscf)     C(s std) =  0.0076
             @ 7% O2(gr/dscf)              C(s std) =  0.0118
             @ 7% O2(mg/dscm)              C(s std) =      27
Particulate Emission Rate    (lb/hr)       E(p)        =  0.081
                             (kg/hr)       E(p)        =  0.037
__________________________________________________________________

Stack Gas Water Vapor Proportion           B(wo)       =  0.383
Molecular Weight of Stack Gas, Dry         M(d)        =  29.37
                               Wet         M(s)        =  25.02
Stack Pressure, absolute (in Hg)           P(s)        =  25.54
Average Stack Velocity (ft/sec)            V(s avg) =   37.1
```

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__________________________________________________________________________
Sample : dClock  :Velocity: Orifice :  Stack  :     Gas  Meter    :SQRT(dP) :FIELD DATA AVERAGES FOR SAMPLE # —  S0916112SM5
 Point :  Time   :Head, dP:Meter,dH :  Temp   :   Temp  (degF)    :         :
       :  (min)  :(in H2O):(in H2O) : (degF)  :    in   :  out    :         :Velocity Head             ("wc)     dP(avg)  =  0.320
__________________________________________________________________________:
     1 :       5 :   0.32 :    2.62 :     166 :     78 :      77 :  0.5657 :Orifice Meter Reading     ("wc)     dH(avg)  =  2.620
     2 :       5 :   0.32 :    2.62 :     166 :     96 :      77 :  0.5657 :
     3 :       5 :   0.32 :    2.62 :     166 :    110 :      82 :  0.5657 :Stack Temperature         (deg F)   T(s avg) =  166.0
     4 :       5 :   0.32 :    2.62 :     166 :    117 :      88 :  0.5657 :                          (deg C)   T(s avg) =   74.4
     5 :       5 :   0.32 :    2.62 :     166 :    123 :      90 :  0.5657 :
     6 :       5 :   0.32 :    2.62 :     166 :    123 :      92 :  0.5657 :Meter Temperature         (deg F)   T(m avg) =  103.1
     1 :       5 :   0.32 :    2.62 :     166 :    124 :      94 :  0.5657 :                          (deg C)   T(m avg) =   39.5
     2 :       5 :   0.32 :    2.62 :     166 :    124 :      94 :  0.5657 :
     3 :       5 :   0.32 :    2.62 :     166 :    124 :      96 :  0.5657 :Root-Mean-Square dP       ("wc)     SQRT(dP) =  0.566
     4 :       5 :   0.32 :    2.62 :     166 :    124 :      97 :  0.5657 :
     5 :       5 :   0.32 :    2.62 :     166 :    124 :      97 :  0.5657 :
     6 :       5 :   0.32 :    2.62 :     166 :    125 :      98 :  0.5657 :
   ——  :——       :——      :——       :——       :——      :——       :——       :
    —  :——       :——      :——       :——       :——      :——       :——       :
       :——       :——      :——       :——       :——      :——       :——       :
   ——  :——       :——      :——       :——       :——      :——       :——       :
   ——  :——       :——      :——       :——       :——      :——       :——       :
   ——  :——       :——      :——       :——       :——      :——       :——       :
   ——  :——       :——      :——       :——       :——      :——       :——       :
__________________________________________________________________________:

TOTALS :      60 :   3.84 : 31.4400 :  1992.0 : 1392.0 :  1082.0 :  6.7882 :
```

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                                                            CALCULATED RESULTS FOR SAMPLE # --  A09201014R17

ISOKINETIC RESULTS                                                                                 % I         =   102.9
   nt:  CRF      Updated  9/21/88   Performed by:      C.KING       Isokineticity
   .e:  9/20/88  Printed  09/23/88  Test No./Type:     A09201014R17  Metered Sample Gas Volume  (scf)        V(m std) =  886.50
Sample Location:  AFTERBURNER       Start/Stop Time:   1014-1558                                (scm)        V(m std) =  25.160
                                                                    Stack Gas Flow, std cond.  (dscfm)      Q(s)     =     543
                                     SYMBOL      VALUE                              std cond.  (dscm/min)Q(s)        =    15.4
PARAMETER                                       (calc.)                             actual     (acfm)       Q(a)     =    2766
                                                                                    actual     (acm/min)    Q(a)     =    76.6
Nozzle Diameter, Actual (in)          N(d)        1.25              Particulate Loading,  dry  (gr/dscf)    C(s std) =  0.1744
Pitot Tube Correction Factor          C(p)        0.84                                @ 7% O2(gr/dscf)     C(s std) =  0.1809
Gas Meter Correction Factor           (alpha)     0.98                                @ 7% O2(mg/dscm)     C(s std) =     414
Stack (Duct) Dimensions (in):                                       Particulate Emission Rate  (lb/hr)      E(p)     =   0.811
        Radius (if round)             R           ----                                         (kg/hr)      E(p)     =   0.368
        Length (if rectangular)       L              20             ----------------------------------------------------------
        Width (if rectangular)        W           12.25             Stack Gas Water Vapor Proportion        B(wo)    =   0.070
Area of Stack (sq ft)                 A(s)     (1.70138 )           Molecular Weight of Stack Gas, Dry      M(d)     =   29.64
                                                                                                  Wet       M(s)     =   28.83
# of Sample Points                    #               1
Total Sampling Time (min)             (theta)  ( 318.00 )           Stack Pressure, absolute (in Hg)        P(s)     =   30.04
Barometric Pressure (in Hg)           P(b)        30.05             Average Stack Velocity (ft/sec)         V(s avg) =    26.5
Stack Pressure (in H2O)               P(stack)    -0.08
Gas Meter Initial Reading (cu ft)               964.368
Gas Meter Final Reading (cu ft)                 2025.34
Net Gas Sample Volume (cu ft)         V(m)     (1060.98 )

Vol of Liquid Collected (ml)          Vl(c)      1410.3
Vol of Liq @ Std. Conds. (scf)        V(w std) ( 66.363 )
Wt. of Filter Particulate (gm)                    1.332
   of Probe Wash Particulate (gm)                 8.71
   of Combined Particulate (gm)       M(p)     (10.0420 )

O2  Concentration (by CEM)            %             7.5
CO2 Concentration (by CEM)            %             8.4
CO  Concentration (by CEM)            %               0
N2  Concentration (by diff.)          %        ( 84.10 )
------------------------------------------------------------------------
Sample : dClock  :Velocity: Orifice  : Stack  :   Gas  Meter  :SQRT(dP) :FIELD DATA AVERAGES FOR SAMPLE # --  A09201014R17
Point  :  Time   :Head, dP:Meter,dH  : Temp   :  Temp  (degF) :         :
       :  (min)  :(in H2O):(in H2O)  : (degF) :   in   :  out :         :Velocity Head           ("wc)     dP(avg)  =   0.048
------------------------------------------------------------------------:
     1 :     318 :  0.048 :      4.4 :   2000 :   171  :  163 :  0.2191 :Orifice Meter Reading   ("wc)     dH(avg)  =   4.400
 ----  :----     :----    :----      :----    :----    :----  :----     :
 ----  :----     :----    :----      :----    :----    :----  :----     :Stack Temperature       (deg F)   T(s avg) =  2000.0
 ----  :----     :----    :----      :----    :----    :----  :----     :                        (deg C)   T(s avg) =  1093.3
 ----  :----     :----    :----      :----    :----    :----  :----     :
 ----  :----     :----    :----      :----    :----    :----  :----     :
 ----  :----     :----    :----      :----    :----    :----  :----     :Meter Temperature       (deg F)   T(m avg) =   167.0
 ----  :----     :----    :----      :----    :----    :----  :----     :                        (deg C)   T(m avg) =    75.0
 ----  :----     :----    :----      :----    :----    :----  :----     :
 ----  :----     :----    :----      :----    :----    :----  :----     :
 ----  :----     :----    :----      :----    :----    :----  :----     :Root-Mean-Square dP     ("wc)     SQRT(dP) =   0.219
 ----  :----     :----    :----      :----    :----    :----  :----     :
 ----  :----     :----    :----      :----    :----    :----  :----     :
 ----  :----     :----    :----      :----    :----    :----  :----     :
 ----  :----     :----    :----      :----    :----    :----  :----     :
 ----  :----     :----    :----      :----    :----    :----  :----     :
 ----  :----     :----    :----      :----    :----    :----  :----     :
 ----  :----     :----    :----      :----    :----    :----  :----     :
 ----  :----     :----    :----      :----    :----    :----  :----     :
------------------------------------------------------------------------:
TOTALS :     318 :   0.05 :   4.4000 : 2000.0 :  171.0 : 163.0 :  0.2191 :
```

Test 10

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ISOKINETIC RESULTS
   nt:  CRF        Updated  9/21/88   Performed by:      W.VESTAL
 ...e:  9/20/88    Printed  09/23/88  Test No./Type:  -  E0920104595
Sample Location:   SCRUBBER OUTLET    Start/Stop Time:   1045-1249

PARAMETER                                 SYMBOL     VALUE
                                                     (calc.)

Nozzle Diameter, Actual (in)              N(d)        0.375
Pitot Tube Correction Factor              C(p)        0.84
Gas Meter Correction Factor               (alpha)     0.99
Stack (Duct) Dimensions (in):
      Radius (if round)                   R              7
      Length (if rectangular)             L           ——
      Width (if rectangular)              W           ——
Area of Stack (sq ft)                     A(s)      (1.06901 )

# of Sample Points                        #              8
Total Sampling Time (min)                 (theta)   ( 120.00 )
Barometric Pressure (in Hg)               P(b)        30.05
Stack Pressure (in H2O)                   P(stack)       -2
Gas Meter Initial Reading (cu ft)                    761.623
Gas Meter Final Reading (cu ft)                      895.742
Wet Gas Sample Volume (cu ft)             V(m)      ( 114.12 )

Vol of Liquid Collected (ml)              Vl(c)      1400.8
Vol of Liq @ Std. Conds. (scf)            V(w std)  ( 65.936 )
Wt. of Filter Particulate (gm)                        0.023
    of Probe Wash Particulate (gm)                    0.01
Wt of Combined Particulate (gm)           M(n)      ( 0.0330 )

O2  Concentration (by CEM)                %            13.6
CO2 Concentration (by CEM)                %             6.2
CO  Concentration (by CEM)                %               0
N2  Concentration (by diff.)              %         (  80.20 )
```

```
CALCULATED RESULTS FOR SAMPLE # —  E0920104595

Isokineticity                               % I         =     95.4
Metered Sample Gas Volume   (scf)           V(m std)    =   105.95
                            (scm)           V(m std)    =    3.000
Stack Gas Flow, std cond.   (dscfm)         Q(s)        =     1250
                std cond.   (dscm/min)      Q(s)        =     35.5
                actual      (acfm)          Q(a)        =     2484
                actual      (acm/min)       Q(a)        =     70.3
Particulate Loading,  dry   (gr/dscf)       C(s std)    =   0.0048
                 @ 7% O2    (gr/dscf)       C(s std)    =   0.0091
                 @ 7% O2    (mg/dscm)       C(s std)    =       21
Particulate Emission Rate   (lb/hr)         E(p)        =    0.053
                            (kg/hr)         E(p)        =    0.024
____________________________________________________________________

Stack Gas Water Vapor Proportion            B(ws)       =    0.384
Molecular Weight of Stack Gas, Dry          M(d)        =    29.54
                               Wet          M(s)        =    25.11
Stack Pressure, absolute (in Hg)            P(s)        =    29.90
Average Stack Velocity (ft/sec)             V(s avg)    =     38.7
```

```
_______________________________________________________________________________
Sample ! dClock  !Velocity! Orifice !  Stack   !   Gas   Meter  !SQRT(dP) !FIELD DATA AVERAGES FOR SAMPLE # —  E0920104595
 Point !  Time   !Head, dP!Meter,dH !  Temp    !  Temp   (degF) !         !
       !  (min)  !(in H2O)!(in H2O) !  (degF)  !   in    !  out !         !Velocity Head             ("wc)     dP(avg)   =   0.349
-------+---------+--------+---------+----------+---------+------+---------!
     1 !      15 !   0.35 !     2.8 !      166 !      81 !   81 ! 0.5916  !Orifice Meter Reading     ("wc)     dH(avg)   =   2.790
     2 !      15 !   0.35 !     2.8 !      166 !     119 !   86 ! 0.5916  !
     3 !      15 !   0.35 !     2.8 !      166 !     130 !   94 ! 0.5916  !Stack Temperature         (deg F)   T(s avg)  =   166.0
     4 !      15 !   0.35 !     2.8 !      166 !     132 !  100 ! 0.5916  !                          (deg C)   T(s avg)  =    74.4
     4 !      15 !   0.35 !     2.8 !      166 !     110 !   98 ! 0.5916  !
     3 !      15 !   0.35 !     2.8 !      166 !     134 !  104 ! 0.5916  !Meter Temperature         (deg F)   T(m avg)  =   109.1
     2 !      15 !   0.35 !     2.8 !      166 !     133 !  104 ! 0.5916  !                          (deg C)   T(m avg)  =    42.8
     1 !      15 !   0.34 !    2.72 !      166 !     135 !  105 ! 0.5631  !
  ——   !——       !——      !——       !——        !——       !——    !——       !Root-Mean-Square dP       ("wc)     SQRT(dP)  =   0.591
  ——   !——       !——      !——       !——        !——       !——    !——       !
  ——   !——       !——      !——       !——        !——       !——    !——       !
  ——   !——       !——      !——       !——        !——       !——    !——       !
  ——   !——       !——      !——       !——        !——       !——    !——       !
  ——   !——       !——      !——       !——        !——       !——    !——       !
  ——   !——       !——      !——       !——        !——       !——    !——       !
  ——   !——       !——      !——       !——        !——       !——    !——       !
  ——   !——       !——      !——       !——        !——       !——    !——       !
  ——   !——       !——      !——       !——        !——       !——    !——       !
-------+---------+--------+---------+----------+---------+------+---------!
TOTALS !     120 !   2.79 ! 22.3200 !   1328.0 !   974.0 ! 772.0! 4.7244  !
```

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ISOKINETIC RESULTS
  ml: CRF       Updated  9/21/88   Performed by:      J.MILLS
  .e:  9/20/88  Printed  09/23/88  Test No./Type:     909201:1295
Sample Location: STACK             Start/Stop Time:   1125-1225

PARAMETER                                  SYMBOL    VALUE
                                                    (calc.)

Nozzle Diameter, Actual (in)              N(d)       0.257
Pitot Tube Correction Factor              C(p)        0.84
Gas Meter Correction Factor               (alpha)        1
Stack (Duct) Dimensions (in):
        Radius (if round)                 R              7
        Length (if rectangular)           L          ___
        Width (if rectangular)            W          ___
Area of Stack (sq ft)                     A(s)     (1.06901 )

# of Sample Points                        #             12
Total Sampling Time (min)                 (theta)  (  60.00 )
Barometric Pressure (in Hg)               P(b)       30.05
Stack Pressure (in H2O)                   P(stack)   -0.08
Gas Meter Initial Reading (cu ft)                  895.009
Gas Meter Final Reading (cu ft)                    946.931
Net Gas Sample Volume (cu ft)             V(m)     (  51.92 )

Vol of Liquid Collected (ml)              Vl(c)     650.75
Vol of Liq @ Std. Conds. (scf)            Vw std)  ( 30.631 )
Wt. of Filter Particulate (gm)                      0.0245
    of Probe Wash Particulate (gm)                    0.01
 -- of Combined Particulate (gm)          M(n)     ( 0.0345 )

O2  Concentration (by CEM)                %           13.6
CO2 Concentration (by CEM)                %            6.2
CO  Concentration (by CEM)                %              0
N2  Concentration (by diff.)              %        (  80.20 )
```

```
CALCULATED RESULTS FOR SAMPLE # ---  909201:1295

Isokineticity                               % I         =   104.9
Metered Sample Gas Volume   (scf)           V(m std) =   49.02
                            (scm)           V(m std) =   1.388
Stack Gas Flow, std cond.   (dscfm)         Q(s)     =    1158
                std cond.   (dscm/min)      Q(s)     =    33.9
                actual      (acfm)          Q(a)     =    1297
                actual      (acm/min)       Q(a)     =    65.1
Particulate Loading,  dry   (gr/dscf)       C(s std) =  0.0109
                   @ 7% O2  (gr/dscf)       C(s std) =  0.0805
                   @ 7% O2  (mg/dscm)       C(s std) =      47
Particulate Emission Rate   (lb/hr)         E(p)     =   0.112
                            (kg/hr)         E(p)     =   0.051
_________________________________________________________________

Stack Gas Water Vapor Proportion            B(ws)    =   0.285
Molecular Weight of Stack Gas, Dry          M(d)     =   29.54
                               Wet          M(s)     =   25.10
Stack Pressure, absolute (in Hg)            P(s)     =   30.04
Average Stack Velocity (ft/sec)             V(s avg) =    35.8
```

```
______________________________________________________________________________
Sample : dClock  :Velocity: Orifice :  Stack  :    Gas  Meter    :SQRT(dP) :FIELD DATA AVERAGES FOR SAMPLE # ---  909201:1295
Point  :  Time   :Head, dP:Meter,dH :  Temp   :   Temp  (degF)   :         :
       :  (min)  :(in H2O):(in H2O) : (degF)  :    in   :  out   :         :Velocity Head          ("wc)      dP(avg)  =  0.300
_______:_________:________:_________:_________:_________:________:_________:
     1 :       5 :    0.3 :    2.46 :     166 :      79 :     79 : 0.5477  :Orifice Meter Reading  ("wc)      dH(avg)  =  2.460
     2 :       5 :    0.3 :    2.46 :     166 :     104 :     80 : 0.5477  :
     3 :       5 :    0.3 :    2.46 :     166 :     115 :     83 : 0. 477  :Stack Temperature      (deg F)    T(s avg) =  166.0
     4 :       5 :    0.3 :    2.46 :     166 :     118 :     87 : 0.5477  :                       (deg C)    T(s avg) =   74.4
     5 :       5 :    0.3 :    2.46 :     166 :     122 :     89 : 0.5477  :
     6 :       5 :    0.3 :    2.46 :     166 :     123 :     91 : 0.5477  :Meter Temperature      (deg F)    T(m avg) =  104.9
     1 :       5 :    0.3 :    2.46 :     166 :     124 :     93 : 0.5477  :                       (deg C)    T(m avg) =   40.5
     2 :       5 :    0.3 :    2.46 :     166 :     125 :     96 : 0.5477  :
     3 :       5 :    0.3 :    2.46 :     166 :     127 :     98 : 0.5477  :Root-Mean-Square dP    ("wc)      SQRT(dP) =  0.548
     4 :       5 :    0.3 :    2.46 :     166 :     127 :     99 : 0.5477  :
     5 :       5 :    0.3 :    2.46 :     166 :     128 :    100 : 0.5477  :
     6 :       5 :    0.3 :    2.46 :     166 :     129 :    101 : 0.5477  :
  ___  :___      :___     :___      :___      :___      :___     :___      :
  ___  :___      :___     :___      :___      :___      :___     :___      :
       :___      :___     :___      :___      :___      :___     :___      :
  ___  :___      :___     :___      :___      :___      :___     :___      :
  ___  :___      :___     :___      :___      :___      :___     :___      :
  ___  :___      :___     :___      :___      :___      :___     :___      :
  ___  :___      :___     :___      :___      :___      :___     :___      :
_______:_________:________:_________:_________:_________:________:_________:
TOTALS :      60 :   3.60 : 29.5200 :  1992.0 :  1421.0 : 1096.0 :  6.5727 :
```

```
ISOKINETIC RESULTS
   nt:  CMF       Updated  9/01/88   Performed By:      C.KING
    e:  09/02/88  Printed  09/23/88  Test No./Type:     A09220942M17
Sample Location:  AFTERBURNER        Start/Stop Time:   0942-1342

PARAMETER                            SYMBOL    VALUE
                                               (calc.)

Nozzle Diameter, Actual (in)         N(d)        1.25
Pitot Tube Correction Factor         C(p)        0.84
Gas Meter Correction Factor          (alpha)     0.98
Stack (Duct) Dimensions (in):
        Radius (if round)            R          ----
        Length (if rectangular)      L             20
        Width (if rectangular)       W          12.25
Area of Stack (sq ft)                A(s)     (1.70138 )

# of Sample Points                   #              1
Total Sampling Time (min)            (theta)  ( 240.00 )
Barometric Pressure (in Hg)          P(b)          30
Stack Pressure (in H2O)              P(stack)   -0.08
Gas Meter Initial Reading (cu ft)              28.987
Gas Meter Final Reading (cu ft)               858.987
Net Gas Sample Volume (cu ft)        V(m)     ( 830.00 )

Vol of Liquid Collected (ml)         Vl(c)    1389.12
Vol of Liq @ Std. Conds. (scf)       V(w std) ( 65.384 )
Wt. of Filter Particulate (gm)                  0.963
   of Probe Wash Particulate (gm)                3.56
   of Combined Particulate (gm)      M(n)     ( 4.5230 )

O2  Concentration (by CEM)           %           7.57
CO2 Concentration (by CEM)           %            8.8
CO  Concentration (by CEM)           %              0
N2  Concentration (by diff.)         %        ( 83.63 )
```

```
CALCULATED RESULTS FOR SAMPLE # --  A09220942M17

Isokineticity                                 % I       =   108.3
Metered Sample Gas Volume  (scf)              V(m std) =  694.48
                           (scm)              V(m std) =  19.666
Stack Gas Flow, std cond.  (dscfm)            Q(s)     =     534
                std cond.  (dscm/min)         Q(s)     =    15.1
                actual     (acfm)             Q(a)     =    2715
                actual     (acm/min)          Q(a)     =    76.9
Particulate Loading,  dry  (gr/dscf)          C(s std) =  0.1005
                    @ 7% O2(gr/dscf)          C(s std) =  0.1048
                    @ 7% O2(mg/dscm)          C(s std) =     240
Particulate Emission Rate  (lb/hr)            E(p)     =   0.460
                           (kg/hr)            E(p)     =   0.209
----------------------------------------------------------------
Stack Gas Water Vapor Proportion              B(ws)    =   0.086
Molecular Weight of Stack Gas, Dry            M(d)     =   29.71
                               Wet            M(s)     =   28.70
Stack Pressure, absolute (in Hg)              P(s)     =   29.99
Average Stack Velocity (ft/sec)               V(s avg) =    26.6
```

```
------------------------------------------------------------------------------
Sample : dClock  :Velocity: Orifice :  Stack  :    Gas  Meter   :SQRT(dP) :FIELD DATA AVERAGES FOR SAMPLE # --  A09220942M17
 Point :  Time   :Head, dP:Meter,dH :  Temp   :   Temp   (degF) :         :
       :  (min)  :(in H2O):(in H2O) : (degF)  :    in   :  out  :         :Velocity Head           ("wc)    dP(avg)  =  0.048
-------+---------+--------+---------+---------+---------+-------+---------:
     1 :     240 :  0.048 :     4.4 :    2000 :     171 :   162 :  0.2191 :Orifice Meter Reading   ("wc)    dH(avg)  =  4.400
  --   :--       :--      :--       :--       :--       :--     :--       :
  --   :--       :--      :--       :--       :--       :--     :--       :Stack Temperature       (deg F)  T(s avg) = 2000.0
  --   :--       :--      :--       :--       :--       :--     :--       :                        (deg C)  T(s avg) = 1093.3
  --   :--       :--      :--       :--       :--       :--     :--       :
  --   :--       :--      :--       :--       :--       :--     :--       :
  --   :--       :--      :--       :--       :--       :--     :--       :Meter Temperature       (deg F)  T(m avg) =  166.5
  --   :--       :--      :--       :--       :--       :--     :--       :                        (deg C)  T(m avg) =   74.7
  --   :--       :--      :--       :--       :--       :--     :--       :
  --   :--       :--      :--       :--       :--       :--     :--       :Root-Mean-Square dP     ("wc)    SQRT(dP) =  0.219
  --   :--       :--      :--       :--       :--       :--     :--       :
  --   :--       :--      :--       :--       :--       :--     :--       :
  --   :--       :--      :--       :--       :--       :--     :--       :
  --   :--       :--      :--       :--       :--       :--     :--       :
  --   :--       :--      :--       :--       :--       :--     :--       :
  --   :--       :--      :--       :--       :--       :--     :--       :
  --   :--       :--      :--       :--       :--       :--     :--       :
  --   :--       :--      :--       :--       :--       :--     :--       :
  --   :--       :--      :--       :--       :--       :--     :--       :
-------+---------+--------+---------+---------+---------+-------+---------:
TOTALS :     240 :   0.05 :  4.4000 :  2000.0 :   171.0 : 162.0 :  0.2191 :
------------------------------------------------------------------------------
```

```
ISOKINETIC RESULTS
   nt:  CRF         Updated  9/23/88   Performed by:        W.VESTAL
   e:   9/22/88     Printed  09/23/88  Test No./Type:       E0922095OM5
Sample Location:  SCRUBBER OUTLET      Start/Stop Time:     0950-1154

PARAMETER                                SYMBOL     VALUE
                                                    (calc.)

Nozzle Diameter, Actual (in)             N(d)        0.375
Pitot Tube Correction Factor             C(p)        0.84
Gas Meter Correction Factor              (alpha)     0.99
Stack (Duct) Dimensions (in):
      Radius (if round)                  R              7
      Length (if rectangular)            L          ——
      Width (if rectangular)             W          ——
Area of Stack (sq ft)                    A(s)       (1.06901 )

# of Sample Points                       #              8
Total Sampling Time (min)                (theta)    ( 120.00 )
Barometric Pressure (in Hg)              P(b)          30
Stack Pressure (in H2O)                  P(stack)      -2
Gas Meter Initial Reading (cu ft)                  897.104
Gas Meter Final Reading (cu ft)                    1008.46
Net Gas Sample Volume (cu ft)            V(m)       ( 111.36 )

Vol of Liquid Collected (ml)             Vl(c)     1472.26
Vol of Liq @ Std. Conds. (scf)           V(w std)  ( 69.299 )
Wt. of Filter Particulate (gm)                       0.086
    of Probe Wash Particulate (gm)                   0.01
 t. of Combined Particulate (gm)         M(n)       ( 0.0960 )

O2  Concentration (by CEM)               %            11.9
CO2 Concentration (by CEM)               %             7.3
CO  Concentration (by CEM)               %               0
N2  Concentration (by diff.)             %          (  80.80 )
```

```
CALCULATED RESULTS FOR SAMPLE # —— E0922095OM5

Isokineticity                                % I         =    56.6
Metered Sample Gas Volume   (scf)            V(m std) =  101.32
                            (scm)            V(m std) =   2.863
Stack Gas Flow, std cond.   (dscfm)          Q(s)      =    1220
               std cond.    (dscm/min)Q(s)             =    34.5
               actual       (acfm)           Q(a)      =    2441
               actual       (acm/min)        Q(a)      =    69.1
Particulate Loading,  dry   (gr/dscf)        C(s std) =  0.0146
                  @ 7% O2(gr/dscf)           C(s std) =  0.0225
                  @ 7% O2(mg/dscm)           C(s std) =      51
Particulate Emission Rate   (lb/hr)          E(p)      =   0.153
                            (kg/hr)          E(p)      =   0.069
______________________________________________________________________
Stack Gas Water Vapor Proportion             B(wo)     =   0.406
Molecular Weight of Stack Gas, Dry           M(d)      =   29.64
                               Wet           M(s)      =   24.91
Stack Pressure, absolute (in Hg)             P(s)      =   29.85
Average Stack Velocity (ft/sec)              V(s avg) =    38.1
```

```
Sample ! dClock  !Velocity! Orifice ! Stack  !   Gas  Meter  !SQRT(dP) !FIELD DATA AVERAGES FOR SAMPLE # —— E0922095OM5
 Point !  Time   !Head, dP!Meter,dH !  Temp  !  Temp  (degF) !         !
       !  (min)  !(in H2O)!(in H2O) ! (degF) !   in  !  out  !         !Velocity Head         ("wc)     dP(avg)  =  0.334
-------+---------+--------+---------+--------+-------+-------+---------!
     1 !      15 !   0.35 !     2.8 !    166 !    93 !    88 ! 0.5916 !Orifice Meter Reading ("wc)     dH(avg)  =  2.670
     2 !      15 !   0.35 !     2.8 !    166 !   130 !    96 ! 0.5916 !
     3 !      15 !   0.35 !     2.8 !    166 !   137 !   104 ! 0.5916 !Stack Temperature     (deg F)   T(s avg) =  166.0
     4 !      15 !   0.34 !    2.72 !    166 !   139 !   110 ! 0.5831 !                      (deg C)   T(s avg) =   74.4
     4 !      15 !   0.32 !    2.56 !    166 !   125 !   110 ! 0.5657 !
     3 !      15 !   0.32 !    2.56 !    166 !   143 !   114 ! 0.5657 !Meter Temperature     (deg F)   T(m avg) =  119.6
     2 !      15 !   0.32 !    2.56 !    166 !   145 !   116 ! 0.5657 !                      (deg C)   T(m avg) =   48.7
     1 !      15 !   0.32 !    2.56 !    166 !   147 !   117 ! 0.5657 !
  ——   !——       !——      !——       !——      !——     !——     !——       !Root-Mean-Square dP   ("wc)     SQRT(dP) =  0.578
  ——   !——       !——      !——       !——      !——     !——     !——       !
  ——   !——       !——      !——       !——      !——     !——     !——       !
  ——   !——       !——      !——       !——      !——     !——     !——       !
  ——   !——       !——      !——       !——      !——     !——     !——       !
  ——   !——       !——      !——       !——      !——     !——     !——       !
  ——   !——       !——      !——       !——      !——     !——     !——       !
  ——   !——       !——      !——       !——      !——     !——     !——       !
  ——   !——       !——      !——       !——      !——     !——     !——       !
  ——   !——       !——      !——       !——      !——     !——     !——       !
  ——   !——       !——      !——       !——      !——     !——     !——       !
-------+---------+--------+---------+--------+-------+-------+---------!
TOTALS !     120 !   2.67 ! 21.3600 ! 1328.0 !1059.0 ! 855.0 ! 4.6207 !
```

Test 11

```
ISOKINETIC RESULTS                                                  CALCULATED RESULTS FOR SAMPLE # --  S09221105M5
   nt:  CRF      Uodated  9/23/88  Performed by:     J.MILLS
    e:  9/22/88  Printed  09/23/88 Test No./Type:    S0922110SM5    Isokineticity                          % I        =  102.5
Samole Location:  STRCK            Start/Stoo Time:  1105-1225      Metered Samole Gas Volume  (scf)       V(m stc) =  47.21
                                                                                               (scm)       V(m std) =  1.337
PARAMETER                            SYMBOL     VALUE               Stack Gas Flow, std cond.  (dscfm)     Q(s)     =   1181
                                                (calc.)                             std cond.  (dscm/min)Q(s)      =   33.5
Nozzle Diameter, Actual (in)         N(d)        0.357                              actual     (acfm)      Q(a)     =   2302
Pitot Tube Correction Factor         C(p)        0.84                               actual     (acm/min)   Q(a)     =   65.2
Gas Meter Correction Factor          (alpha)        1               Particulate Loading,  dry  (gr/dscf)   C(s std) = 0.0107
Stack (Duct) Dimensions (in):                                                      @ 7% O2(gr/dscf)   C(s std) = 0.0164
        Radius (if round)            R              7                               @ 7% O2(mg/dscm)   C(s std) =     38
        Length (if rectangular)      L          ___                 Particulate Emission Rate  (lb/hr)     E(p)     =  0.108
        Width (if rectangular)       W          ___                                            (kg/hr)     E(p)     =  0.049
Area of Stack (sq ft)                A(s)      (1.06901 )           ____________________________________________________________
                                                                    Stack Gas Water Vapor Proportion       B(wo)    =  0.393
# of Samole Points                   #             12               Molecular Weight of Stack Gas, Dry     M(d)     =  29.64
Total Sampling Time (min)            (theta)   (  60.00 )                                          Wet     M(s)     =  25.07
Barometric Pressure (in Hg)          P(b)          30               Stack Pressure, absolute (in Hg)       P(s)     =  29.99
Stack Pressure (in H2O)              P(stack)   -0.08               Average Stack Velocity (ft/sec)        V(s avg) =   35.9
Gas Meter Initial Reading (cu ft)              947.192
Gas Meter Final Reading (cu ft)                998.438
Net Gas Sample Volume (cu ft)        V(m)      (  51.25 )

Vol of Liquic Collected (ml)         Vl(c)      649.51
Vol of Lic @ Sto. Conds. (scf)       V(w stc)  ( 30.572 )
Wt. of Filter Particulate (gm)                  0.0326
    of Probe Wash Particulate (gm)                   0
  W of Combined Particulate (gm)     M(p)      ( 0.0326 )

O2  Concentration (by CEM)           %            11.9
CO2 Concentration (by CEM)           %             7.3
CO  Concentration (by CEM)           %               0
N2  Concentration (by diff.)         %         (  80.80 )
____________________________________________________________________
Sample ! dClock  !Velocity! Orifice ! Stack  !   Gas  Meter   !SQRT(dP) !FIELD DATA AVERAGES FOR SAMPLE # --  S09221105M5
 Point !  Time   !Head, dP!Meter,dH !  Temp  !   Temp (degF)  !         !
       !  (min)  !(in H2O)!(in H2O) ! (degF) !   in   !  out  !         !Velocity Head          ("wc)     dP(avg)  =  0.300
-------------------------------------------------------------------------!
     1 !       5 !    0.3 !    2.46 !    166 !     98 !     91 ! 0.5477 !Orifice Meter Reading  ("wc)     dH(avg)  =  2.460
     2 !       5 !    0.3 !    2.46 !    166 !    113 !     92 ! 0.5477 !
     3 !       5 !    0.3 !    2.46 !    166 !    123 !     94 ! 0.5477 !Stack Temoerature      (deg F)   T(s avg) =  166.0
     4 !       5 !    0.3 !    2.46 !    166 !    132 !     98 ! 0.5477 !                       (deg C)   T(s avg) =   74.4
     5 !       5 !    0.3 !    2.46 !    166 !    134 !    101 ! 0.5477 !
     6 !       5 !    0.3 !    2.46 !    166 !    137 !    103 ! 0.5477 !Meter Temoerature      (deg F)   T(m avg) =  117.9
     1 !       5 !    0.3 !    2.46 !    166 !    138 !    107 ! 0.5477 !                       (deg C)   T(m avg) =   47.7
     2 !       5 !    0.3 !    2.46 !    166 !    140 !    109 ! 0.5477 !
     3 !       5 !    0.3 !    2.46 !    166 !    140 !    111 ! 0.5477 !Root-Mean-Square dP    ("wc)     SQRT(dP) =  0.548
     4 !       5 !    0.3 !    2.46 !    166 !    141 !    113 ! 0.5477 !
     5 !       5 !    0.3 !    2.46 !    166 !    142 !    114 ! 0.5477 !
     6 !       5 !    0.3 !    2.46 !    166 !    143 !    115 ! 0.5477 !
   --- !---      !---     !---      !---     !---     !---     !---     !
   --- !---      !---     !---      !---     !---     !---     !---     !
       !---      !---     !---      !---     !---     !---     !---     !
   --- !---      !---     !---      !---     !---     !---     !---     !
   --- !---      !---     !---      !---     !---     !---     !---     !
   --- !---      !---     !---      !---     !---     !---     !---     !
   --- !---      !---     !---      !---     !---     !---     !---     !
-------------------------------------------------------------------------!
TOTALS !      60 !   3.60 ! 29.5200 ! 1992.0 ! 1581.0 ! 1248.0 ! 6.5727 !
___________________________________________________________________________________________________________________________
```

Test 3

```
ISOKINETIC RESULTS
P[illegible]   CRF        Updated  9/21/88   Performed by:        C.KING
Date:  09/26/88    Printed  09/24/88  Test No./Type:       A09261035M5T1
Sample Location:  AFTERBURNER         Start/Stop Time:     1035-1330

                                      SYMBOL       VALUE
PARAMETER                                         (calc.)

Nozzle Diameter, Actual (in)          N(d)          0.57
Pitot Tube Correction Factor          C(p)          0.84
Gas Meter Correction Factor           (alpha)       0.97
Stack (Duct) Dimensions (in):
        Radius (if round)             R             ----
        Length (if rectangular)       L               20
        Width (if rectangular)        W            12.25
Area of Stack (sq ft)                 A(s)      (1.70138 )

# of Sample Points                    #                1
Total Sampling Time (min)             (theta)   ( 141.00 )
Barometric Pressure (in Hg)           P(b)          30.1
Stack Pressure (in H2O)               P(stack)     -0.08
Gas Meter Initial Reading (cu ft)                969.765
Gas Meter Final Reading (cu ft)                  1082.19
Net Gas Sample Volume (cu ft)         V(m)      ( 112.43 )

Vol of Liquid Collected (ml)          Vl(c)       192.07
Vol of Liq @ Std. Conds. (scf)        V(w std) (  9.041 )
[illegible] of Filter Particulate (gm)                   0.0674
[illegible] of Probe Wash Particulate (gm)                 0.03
Wt of Combined Particulate (gm)       M(n)      ( 0.0974 )

O2  Concentration (by CEM)            %              7.3
CO2 Concentration (by CEM)            %              9.3
CO  Concentration (by CEM)            %                0
N2  Concentration (by diff.)          %         ( 83.40 )
```

```
CALCULATED RESULTS FOR SAMPLE # -- A09261035M5T1

Isokineticity                                  % I       =    96.3
Metered Sample Gas Volume     (scf)            V(m std)  =   97.51
                              (scm)            V(m std)  =   2.761
Stack Gas Flow, std cond.     (dscfm)          Q(s)      =     690
                std cond.     (dscm/min)       Q(s)      =    19.5
                actual        (acfm)           Q(a)      =    3494
                actual        (acm/min)        Q(a)      =    99.0
Particulate Loading,  dry     (gr/dscf)        C(s std)  =  0.0154
                 @ 7% O2      (gr/dscf)        C(s std)  =  0.0157
                 @ 7% O2      (mg/dscm)        C(s std)  =      36
Particulate Emission Rate     (lb/hr)          E(p)      =   0.091
                              (kg/hr)          E(p)      =   0.041
------------------------------------------------------------------
Stack Gas Water Vapor Proportion               B(wo)     =   0.085
Molecular Weight of Stack Gas, Dry             M(d)      =   29.78
                               Wet             M(s)      =   28.78
Stack Pressure, absolute (in Hg)               P(s)      =   30.09
Average Stack Velocity (ft/sec)                V(s avg)  =    34.2
```

```
-----------------------------------------------------------------------------
Sample ! dClock  !Velocity! Orifice ! Stack  !   Gas  Meter    !SQRT(dP) !FIELD DATA AVERAGES FOR SAMPLE # -- A09261035M5T1
 Point !  Time   !Head, dP!Meter,dH !  Temp  !  Temp  (degF)   !         !
       !  (min)  !(in H2O)!(in H2O) ! (degF) !   in   !  out   !         !Velocity Head          ("wc)      dP(avg)   =   0.080
-----------------------------------------------------------------------------!
     1 !     141 !   0.08 !    1.15 !   2000 !    142 !    129 !  0.2828 !Orifice Meter Reading  ("wc)      dH(avg)   =   1.150
     0 !       0 !      0 !       0 !      0 !      0 !      0 !  0.0000 !
  ---  !---      !---     !---      !---     !---     !---     !---      !Stack Temperature      (deg F)    T(s avg)  =  2000.0
  ---  !---      !---     !---      !---     !---     !---     !---      !                       (deg C)    T(s avg)  =  1093.3
  ---  !---      !---     !---      !---     !---     !---     !---      !
  ---  !---      !---     !---      !---     !---     !---     !---      !
  ---  !---      !---     !---      !---     !---     !---     !---      !Meter Temperature      (deg F)    T(m avg)  =   135.5
  ---  !---      !---     !---      !---     !---     !---     !---      !                       (deg C)    T(m avg)  =    57.5
  ---  !---      !---     !---      !---     !---     !---     !---      !
  ---  !---      !---     !---      !---     !---     !---     !---      !
  ---  !---      !---     !---      !---     !---     !---     !---      !Root-Mean-Square dP    ("wc)      SQRT(dP)  =   0.283
  ---  !---      !---     !---      !---     !---     !---     !---      !
  ---  !---      !---     !---      !---     !---     !---     !---      !
  ---  !---      !---     !---      !---     !---     !---     !---      !
  ---  !---      !---     !---      !---     !---     !---     !---      !
  ---  !---      !---     !---      !---     !---     !---     !---      !
  ---  !---      !---     !---      !---     !---     !---     !---      !
  ---  !---      !---     !---      !---     !---     !---     !---      !
  ---  !---      !---     !---      !---     !---     !---     !---      !
-----------------------------------------------------------------------------
TOTALS !     141 !   0.08 !  1.1500 ! 2000.0 !  142.0 !  129.0 !  0.2828 !
```

```
ISOKINETIC RESULTS
[illegible] CRF      Updated  9/21/88   Performed by:     C.KING
Date:   09/26/88  Printed  09/24/88   Test No./Type:    A0926103SMST2
Sample Location:  AFTERBURNER         Start/Stop Time:  1035-1330

PARAMETER                              SYMBOL      VALUE
                                                   (calc.)

Nozzle Diameter, Actual (in)           N(d)          0.57
Pitot Tube Correction Factor           C(p)          0.84
Gas Meter Correction Factor            (alpha)       1.02
Stack (Duct) Dimensions (in):
        Radius (if round)              R            ——
        Length (if rectangular)        L               20
        Width (if rectangular)         W            12.25
Area of Stack (sq ft)                  A(s)     (1.70138 )

# of Sample Points                     #                1
Total Sampling Time (min)              (theta)  ( 141.00 )
Barometric Pressure (in Hg)            P(b)          30.1
Stack Pressure (in H2O)                P(stack)     -0.08
Gas Meter Initial Reading (cu ft)                  895.72
Gas Meter Final Reading (cu ft)                   1006.92
Net Gas Sample Volume (cu ft)          V(m)     ( 111.20 )

Vol of Liquid Collected (ml)           Vl(c)          307
Vol of Liq @ Std. Conds. (scf)         V(w std) ( 14.450 )
[illegible]f Filter Particulate (gm)                         0
[illegible] of Probe Wash Particulate (gm)                   0
Wt of Combined Particulate (gm)        M(n)     ( 0.0000 )

O2  Concentration (by CEM)             %              7.3
CO2 Concentration (by CEM)             %              9.3
CO  Concentration (by CEM)             %                0
N2  Concentration (by diff.)           %        (  83.40 )
```

```
CALCULATED RESULTS FOR SAMPLE # —— A0926103SMST2

Isokineticity                                % I          =   101.8
Metered Sample Gas Volume     (scf)          V(m std)     =  101.42
                              (scm)          V(m std)     =   2.872
Stack Gas Flow, std cond.     (dscfm)        Q(s)         =     666
                std cond.     (dscm/min)     Q(s)         =    18.9
                actual        (acfm)         Q(a)         =    3523
                actual        (acm/min)      Q(a)         =    99.8
Particulate Loading,  dry     (gr/dscf)      C(s std)     =  0.0000
                   @ 7% O2(gr/dscf)          C(s std)     =  0.0000
                   @ 7% O2(mg/dscm)          C(s std)     =       0
Particulate Emission Rate     (lb/hr)        E(p)         =   0.000
                              (kg/hr)        E(p)         =   0.000
________________________________________________________________________

Stack Gas Water Vapor Proportion             B(wo)        =   0.125
Molecular Weight of Stack Gas, Dry           M(d)         =   29.78
                               Wet           M(s)         =   28.31
Stack Pressure, absolute (in Hg)             P(s)         =   30.09
Average Stack Velocity (ft/sec)              V(s avg)     =    34.5
```

```
Sample ! dClock !Velocity! Orifice ! Stack  !   Gas  Meter  !SQRT(dP) !FIELD DATA AVERAGES FOR SAMPLE # —— A0926103SMST2
 Point !  Time  !Head, dP!Meter,dH !  Temp  !   Temp  (degF) !         !
       !  (min) !(in H2O)!(in H2O) ! (degF) !   in   !  out   !         !Velocity Head          ("wc)     dP(avg)  =   0.080
----------------------------------------------------------------------!
     1 !    141 !   0.08 !    1.15 !   2000 !    142 !    129 !  0.2828 !Orifice Meter Reading  ("wc)     dH(avg)  =   1.150
     0 !      0 !      0 !       0 !      0 !      0 !      0 !  0.0000 !
    —— !——      !——      !——       !——      !——      !——      !——       !Stack Temperature      (deg F)   T(s avg) =  2000.0
    —— !——      !——      !——       !——      !——      !——      !——       !                       (deg C)   T(s avg) =  1093.3
    —— !——      !——      !——       !——      !——      !——      !——       !
    —— !——      !——      !——       !——      !——      !——      !——       !
    —— !——      !——      !——       !——      !——      !——      !——       !Meter Temperature      (deg F)   T(m avg) =   135.5
    —— !——      !——      !——       !——      !——      !——      !——       !                       (deg C)   T(m avg) =    57.5
    —— !——      !——      !——       !——      !——      !——      !——       !
    —— !——      !——      !——       !——      !——      !——      !——       !
    —— !——      !——      !——       !——      !——      !——      !——       !Root-Mean-Square dP    ("wc)     SQRT(dP) =   0.283
    —— !——      !——      !——       !——      !——      !——      !——       !
    —— !——      !——      !——       !——      !——      !——      !——       !
    —— !——      !——      !——       !——      !——      !——      !——       !
    —— !——      !——      !——       !——      !——      !——      !——       !
    —— !——      !——      !——       !——      !——      !——      !——       !
    —— !——      !——      !——       !——      !——      !——      !——       !
    —— !——      !——      !——       !——      !——      !——      !——       !
    —— !——      !——      !——       !——      !——      !——      !——       !
----------------------------------------------------------------------!
TOTALS !    141 !   0.08 !  1.1500 ! 2000.0 !  142.0 !  129.0 !  0.2828 !
```

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                                                                   CALCULATED RESULTS FOR SAMPLE # --  E0926104771

ISOKINETIC RESULTS                                                 Isokineticity                                % I          =    98.6
Plant:  CRF      Updated  9/23/88   Performed by:     M.VESTAL     Metered Sample Gas Volume  (scf)             V(m std)   =  105.92
Date:   9/26/88  Printed  09/24/88  Test No./Type:    E0926104771                             (scm)             V(m std)   =   2.999
[illegible]e Location:  SCRUBBER OUTLET   Start/Stop Time:  1047-1250  Stack Gas Flow, std cond.  (dscfm)       Q(s)       =    1378
                                                                                  std cond.   (dscm/min)        Q(s)       =    39.0
PARAMETER                              SYMBOL     VALUE                           actual      (acfm)            Q(a)       =    2454
                                                  (calc.)                         actual      (acm/min)         Q(a)       =    69.5
                                                                   Particulate Loading,  dry  (gr/dscf)         C(s std)   =  0.0104
Nozzle Diameter, Actual (in)           N(d)        0.357                          @ 7% O2(gr/dscf)              C(s std)   =  0.0161
Pitot Tube Correction Factor           C(p)        0.84                           @ 7% O2(mg/dscm)              C(s std)   =      37
Gas Meter Correction Factor            (alpha)     0.99            Particulate Emission Rate  (lb/hr)           E(p)       =   0.123
Stack (Duct) Dimensions (in):                                                                 (kg/hr)           E(p)       =   0.056
      Radius (if round)                R               7           ---------------------------------------------------------------
      Length (if rectangular)          L           ___             Stack Gas Water Vapor Proportion             B(wo)      =   0.335
      Width (if rectangular)           W           ___             Molecular Weight of Stack Gas, Dry           M(d)       =   29.68
Area of Stack (sq ft)                  A(s)      (1.06901 )                                       Wet           M(s)       =   25.76
                                                                   Stack Pressure, absolute (in Hg)             P(s)       =   29.95
# of Sample Points                     #               8           Average Stack Velocity (ft/sec)              V(s avg)   =    38.3
Total Sampling Time (min)              (theta)   ( 120.00 )
Barometric Pressure (in Hg)            P(b)         30.1
Stack Pressure (in H2O)                P(stack)       -2
Gas Meter Initial Reading (cu ft)                 12.221
Gas Meter Final Reading (cu ft)                  125.516
Net Gas Sample Volume (cu ft)          V(m)      ( 113.30 )

Vol of Liquid Collected (ml)           Vl(c)     1134.83
Vol of Liq @ Std. Conds. (scf)         V(w std)  ( 53.416 )
Wt. of Filter Particulate (gm)                    0.0615
Wt. of Probe Wash Particulate (gm)                  0.01
W[illegible] Combined Particulate (gm)         M(p)      ( 0.0715 )

O2  Concentration (by CEM)             %           11.97
CO2 Concentration (by CEM)             %             7.5
CO  Concentration (by CEM)             %               0
N2  Concentration (by diff.)           %         ( 80.53 )
-------------------------------------------------------------------------------
Sample ! dClock  !Velocity! Orifice !  Stack  !   Gas   Meter  !SQRT(dP) !FIELD DATA AVERAGES FOR SAMPLE # --  E0926104771
 Point !  Time   !Head, dP!Meter,dH !  Temp   !  Temp   (degF) !         !
       !  (min)  !(in H2O)!(in H2O) !  (degF) !   in   !  out  !         !Velocity Head          ("wc)     dP(avg)   =   0.350
-------+---------+--------+---------+---------+--------+-------+---------!
     1 !      15 !   0.35 !     2.8 !     166 !     89 !    78 !  0.5916 !Orifice Meter Reading  ("wc)     dH(avg)   =   2.800
     2 !      15 !   0.35 !     2.8 !     166 !    116 !    86 !  0.5916 !
     3 !      15 !   0.35 !     2.8 !     166 !    123 !    96 !  0.5916 !Stack Temperature      (deg F)   T(s avg)  =   166.0
     4 !      15 !   0.35 !     2.8 !     166 !    125 !    98 !  0.5916 !                       (deg C)   T(s avg)  =    74.4
     4 !      15 !   0.35 !     2.8 !     166 !    103 !    95 !  0.5916 !
     3 !      15 !   0.35 !     2.8 !     166 !    126 !   101 !  0.5916 !Meter Temperature      (deg F)   T(m avg)  =   106.1
     2 !      15 !   0.35 !     2.8 !     166 !    129 !   103 !  0.5916 !                       (deg C)   T(m avg)  =    41.2
     1 !      15 !   0.35 !     2.8 !     166 !    127 !   103 !  0.5916 !
   --- !---      !---     !---      !---      !---     !---    !---      !Root-Mean-Square dP    ("wc)     SQRT(dP)  =   0.592
   --- !---      !---     !---      !---      !---     !---    !---      !
   --- !---      !---     !---      !---      !---     !---    !---      !
   --- !---      !---     !---      !---      !---     !---    !---      !
   --- !---      !---     !---      !---      !---     !---    !---      !
   --- !---      !---     !---      !---      !---     !---    !---      !
   --- !---      !---     !---      !---      !---     !---    !---      !
   --- !---      !---     !---      !---      !---     !---    !---      !
   --- !---      !---     !---      !---      !---     !---    !---      !
   --- !---      !---     !---      !---      !---     !---    !---      !
   --- !---      !---     !---      !---      !---     !---    !---      !
-------+---------+--------+---------+---------+--------+-------+---------!
TOTALS !     120 !   2.80 ! 22.4000 !  1328.0 !  938.0 ! 760.0 !  4.7329 !
```

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ISOKINETIC RESULTS
Plant:  CRF         Updated  9/23/88   Performed by:        W.VESTAL
D[illegible]   9/26/88  Printed  09/24/88  Test No./Type:       E0926104772
[illegible]e Location:  SCRUBBER OUTLET   Start/Stop Time:     1047-1250

                                            SYMBOL     VALUE
PARAMETER                                              (calc.)

Nozzle Diameter, Actual (in)                N(d)        0.357
Pitot Tube Correction Factor                C(p)         0.84
Gas Meter Correction Factor                 (alpha)      0.99
Stack (Duct) Dimensions (in):
        Radius (if round)                   R               7
        Length (if rectangular)             L           ___
        Width (if rectangular)              W           ___
Area of Stack (sq ft)                       A(s)       (1.06901 )

# of Sample Points                          #               8
Total Sampling Time (min)                   (theta)    ( 120.00 )
Barometric Pressure (in Hg)                 P(b)         30.1
Stack Pressure (in H2O)                     P(stack)       -2
Gas Meter Initial Reading (cu ft)                     435.623
Gas Meter Final Reading (cu ft)                       544.189
Net Gas Sample Volume (cu ft)               V(m)       ( 106.57 )

Vol of Liquid Collected (ml)                Vl(c)     1565.47
Vol of Liq @ Std. Conds. (scf)              V(w std)   ( 73.687 )
Wt. of Filter Particulate (gm)                              0
Wt. of Probe Wash Particulate (gm)                          0
[illegible]f Combined Particulate (gm)              M(p)       ( 0.0000 )

O2  Concentration (by CEM)                  %           11.97
CO2 Concentration (by CEM)                  %             7.5
CO  Concentration (by CEM)                  %               0
N2  Concentration (by diff.)                %          ( 80.53 )
```

```
CALCULATED RESULTS FOR SAMPLE # ---  E0926104772

Isokineticity                                  % I         =   106.4
Metered Sample Gas Volume   (scf)              V(m std) =   101.70
                            (scm)              V(m std) =    2.880
Stack Gas Flow, std cond.   (dscfm)            Q(s)      =     1225
                std cond.   (dscm/min)Q(s)               =     34.7
                actual      (acfm)             Q(a)      =     2503
                actual      (acm/min)          Q(a)      =     70.9
Particulate Loading,  dry   (gr/dscf)          C(s std) =   0.0000
                  @ 7% O2(gr/dscf)             C(s std) =   0.0000
                  @ 7% O2(mg/dscm)             C(s std) =        0
Particulate Emission Rate   (lb/hr)            E(p)      =    0.000
                            (kg/hr)            E(p)      =    0.000
__________________________________________________________________

Stack Gas Water Vapor Proportion               B(wo)     =    0.420
Molecular Weight of Stack Gas, Dry             M(d)      =    29.68
                               Wet             M(s)      =    24.77
Stack Pressure, absolute (in Hg)               P(s)      =    29.95
Average Stack Velocity (ft/sec)                V(s avg) =     39.0
```

```
_____________________________________________________________________________
Sample ¦ dClock  ¦Velocity¦ Orifice ¦  Stack  ¦   Gas   Meter  ¦SQRT(dP) ¦FIELD DATA AVERAGES FOR SAMPLE # --  E0926104772
 Point ¦  Time   ¦Head, dP¦Meter,dH ¦  Temp   ¦  Temp   (degF) ¦         ¦
       ¦  (min)  ¦(in H2O)¦(in H2O) ¦ (degF)  ¦   in   ¦  out  ¦         ¦Velocity Head          ("wc)      dP(avg)  =   0.350
_______________________________________________________________________________¦
     1 ¦      15 ¦   0.35 ¦     2.8 ¦     166 ¦     79 ¦    75 ¦  0.5916 ¦Orifice Meter Reading  ("wc)      dH(avg)  =   2.800
     2 ¦      15 ¦   0.35 ¦     2.8 ¦     166 ¦    114 ¦    81 ¦  0.5916 ¦
     3 ¦      15 ¦   0.35 ¦     2.8 ¦     166 ¦    123 ¦    90 ¦  0.5916 ¦Stack Temperature      (deg F)    T(s avg) =   166.0
     4 ¦      15 ¦   0.35 ¦     2.8 ¦     166 ¦    126 ¦    96 ¦  0.5916 ¦                       (deg C)    T(s avg) =    74.4
     4 ¦      15 ¦   0.35 ¦     2.8 ¦     166 ¦    103 ¦    98 ¦  0.5916 ¦
     3 ¦      15 ¦   0.35 ¦     2.8 ¦     166 ¦    128 ¦   101 ¦  0.5916 ¦Meter Temperature      (deg F)    T(m avg) =   105.0
     2 ¦      15 ¦   0.35 ¦     2.8 ¦     166 ¦    130 ¦   103 ¦  0.5916 ¦                       (deg C)    T(m avg) =    40.6
     1 ¦      15 ¦   0.35 ¦     2.8 ¦     166 ¦    129 ¦   104 ¦  0.5916 ¦
   ___ ¦___      ¦___     ¦___      ¦___      ¦___     ¦___    ¦___      ¦Root-Mean-Square dP    ("wc)      SQRT(dP) =   0.592
   ___ ¦___      ¦___     ¦___      ¦___      ¦___     ¦___    ¦___      ¦
   ___ ¦___      ¦___     ¦___      ¦___      ¦___     ¦___    ¦___      ¦
   ___ ¦___      ¦___     ¦___      ¦___      ¦___     ¦___    ¦___      ¦
   ___ ¦___      ¦___     ¦___      ¦___      ¦___     ¦___    ¦___      ¦
   ___ ¦___      ¦___     ¦___      ¦___      ¦___     ¦___    ¦___      ¦
   ___ ¦___      ¦___     ¦___      ¦___      ¦___     ¦___    ¦___      ¦
   ___ ¦___      ¦___     ¦___      ¦___      ¦___     ¦___    ¦___      ¦
   ___ ¦___      ¦___     ¦___      ¦___      ¦___     ¦___    ¦___      ¦
   ___ ¦___      ¦___     ¦___      ¦___      ¦___     ¦___    ¦___      ¦
   ___ ¦___      ¦___     ¦___      ¦___      ¦___     ¦___    ¦___      ¦
   ___ ¦___      ¦___     ¦___      ¦___      ¦___     ¦___    ¦___      ¦
_______________________________________________________________________________¦
TOTALS ¦     120 ¦   2.80 ¦ 22.4000 ¦  1328.0 ¦  932.0 ¦ 748.0 ¦  4.7329 ¦
```

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ISOKINETIC RESULTS
Plant:  CRF        Updated  9/23/88   Performed by:      J.MILLS
Date:    9/26/88   Printed  09/24/88  Test No./Type:     90926114595
[illegible]e Location:  STACK                Start/Stop Time:   1145-1245

PARAMETER                                  SYMBOL     VALUE
                                                      (calc.)
Nozzle Diameter, Actual (in)               N(d)        0.357
Pitot Tube Correction Factor               C(p)        0.84
Gas Meter Correction Factor                (alpha)        1
Stack (Duct) Dimensions (in):
       Radius (if round)                   R              7
       Length (if rectangular)             L          ___
       Width (if rectangular)              W          ___
Area of Stack (sq ft)                      A(s)     (1.06901 )

# of Sample Points                         #             12
Total Sampling Time (min)                  (theta)  (  60.00 )
Barometric Pressure (in Hg)                P(b)        30.1
Stack Pressure (in H2O)                    P(stack)   -0.08
Gas Meter Initial Reading (cu ft)                     12.163
Gas Meter Final Reading (cu ft)                       64.853
Net Gas Sample Volume (cu ft)              V(m)     (  52.69 )

Vol of Liquid Collected (ml)               Vl(c)      491.09
Vol of Liq @ Std. Conds. (scf)             V(w std) ( 23.210 )
Wt. of Filter Particulate (gm)                        0.0357
Wt. of Probe Wash Particulate (gm)                         0
[illegible]f Combined Particulate (gm)            M(p)     ( 0.0357 )

O2  Concentration (by CEM)                 %           12.01
CO2 Concentration (by CEM)                 %             7.8
CO  Concentration (by CEM)                 %               0
N2  Concentration (by diff.)               %        (  80.19 )
```

```
CALCULATED RESULTS FOR SAMPLE # ---  90926114595

Isokineticity                                  % I        =    97.8
Metered Sample Gas Volume   (scf)              V(m std) =   49.78
                            (scm)              V(m std) =   1.410
Stack Gas Flow, std cond.   (dscfm)            Q(s)     =    1306
                std cond.   (dscm/min)         Q(s)     =    37.0
                actual      (acfm)             Q(a)     =    2257
                actual      (acm/min)          Q(a)     =    63.9
Particulate Loading,  dry   (gr/dscf)          C(s std) =  0.0111
                @ 7% O2     (gr/dscf)          C(s std) =  0.0172
                @ 7% O2     (mg/dscm)          C(s std) =      39
Particulate Emission Rate   (lb/hr)            E(p)     =   0.124
                            (kg/hr)            E(p)     =   0.056
_____________________________________________________________________

Stack Gas Water Vapor Proportion               B(wo)    =   0.318
Molecular Weight of Stack Gas, Dry             M(d)     =   29.73
                               Wet             M(s)     =   26.00
Stack Pressure, absolute (in Hg)               P(s)     =   30.09
Average Stack Velocity (ft/sec)                V(s avg) =    35.2
```

```
____________________________________________________________________________
Sample ! dClock  !Velocity! Orifice !  Stack  !   Gas  Meter   !SQRT(dP) !FIELD DATA AVERAGES FOR SAMPLE # ---  90926114595
 Point !  Time   !Head, dP!Meter,dH !  Temp   !   Temp  (degF) !         !
       !  (min)  !(in H2O)!(in H2O) ! (degF)  !   in   !  out  !         !Velocity Head           ("wc)     dP(avg)  =  0.300
-------+---------+--------+---------+---------+--------+-------+---------!
     1 !       5 !    0.3 !    2.46 !     166 !    107 !    84 ! 0.5477  !Orifice Meter Reading   ("wc)     dH(avg)  =  2.460
     2 !       5 !    0.3 !    2.46 !     166 !    115 !    86 ! 0.5477  !
     3 !       5 !    0.3 !    2.46 !     166 !    117 !    88 ! 0.5477  !Stack Temperature       (deg F)   T(s avg) =  166.0
     4 !       5 !    0.3 !    2.46 !     166 !    118 !    90 ! 0.5477  !                        (deg C)   T(s avg) =   74.4
     5 !       5 !    0.3 !    2.46 !     166 !    119 !    91 ! 0.5477  !
     6 !       5 !    0.3 !    2.46 !     166 !    119 !    92 ! 0.5477  !Meter Temperature       (deg F)   T(m avg) =  105.4
     1 !       5 !    0.3 !    2.46 !     166 !    121 !    94 ! 0.5477  !                        (deg C)   T(m avg) =   40.8
     2 !       5 !    0.3 !    2.46 !     166 !    121 !    95 ! 0.5477  !
     3 !       5 !    0.3 !    2.46 !     166 !    121 !    96 ! 0.5477  !Root-Mean-Square dP     ("wc)     SQRT(dP) =  0.548
     4 !       5 !    0.3 !    2.46 !     166 !    121 !    97 ! 0.5477  !
     5 !       5 !    0.3 !    2.46 !     166 !    122 !    97 ! 0.5477  !
     6 !       5 !    0.3 !    2.46 !     166 !    122 !    97 ! 0.5477  !
   ___ !___      !___     !___      !___      !___     !___    !___      !
   ___ !___      !___     !___      !___      !___     !___    !___      !
   ___ !___      !___     !___      !___      !___     !___    !___      !
       !___      !___     !___      !___      !___     !___    !___      !
       !___      !___     !___      !___      !___     !___    !___      !
   ___ !___      !___     !___      !___      !___     !___    !___      !
   ___ !___      !___     !___      !___      !___     !___    !___      !
-------+---------+--------+---------+---------+--------+-------+---------!
TOTALS !      60 !   3.60 ! 29.5200 !  1992.0 ! 1423.0 ! 1107.0 ! 6.5727 !
```

```
ISOKINETIC RESULTS
  nt:  CRF        Updated  9/21/88   Performed by:      C.KING
  e:   05/28/88   Printed 10/03/88   Test No./Type:     A09280931M5T1
Sample Location:  AFTERBURNER        Start/Stop Time:   0931-1230

                                       SYMBOL      VALUE
PARAMETER                                          (calc.)

Nozzle Diameter, Actual (in)           N(d)         0.52
Pitot Tube Correction Factor           C(p)         0.84
Gas Meter Correction Factor            (alpha)      0.97
Stack (Duct) Dimensions (in):
      Radius (if round)                R            ——
      Length (if rectangular)          L              20
      Width (if rectangular)           W           12.25
Area of Stack (sq ft)                  A(s)      (1.70138 )

# of Sample Points                     #               1
Total Sampling Time (min)              (theta)   ( 179.00 )
Barometric Pressure (in Hg)            P(b)         29.9
Stack Pressure (in H2O)                P(stack)    -0.08
Gas Meter Initial Reading (cu ft)                 84.332
Gas Meter Final Reading (cu ft)                  198.425
Net Gas Sample Volume (cu ft)          V(m)      ( 114.09 )

Vol of Liquid Collected (ml)           Vl(c)      153.37
Vol of Liq @ Std. Conds. (scf)         V(w std) (  7.219 )
Wt. of Filter Particulate (gm)                     0.065
    of Probe Wash Particulate (gm)                     0
wt of Combined Particulate (gm)        M(p)      ( 0.0650 )

O2  Concentration (by CEM)             %             7.2
CO2 Concentration (by CEM)             %             9.1
CO  Concentration (by CEM)             %               0
N2  Concentration (by diff.)           %         ( 83.70 )
```

```
CALCULATED RESULTS FOR SAMPLE # —— A09280531P5T1

                                              % I       =    92.7
Isokineticity
Metered Sample Gas Volume   (scf)             V(m std)  =  100.49
                            (scm)             V(m std)  =   2.846

Stack Gas Flow, std cond.   (dscfm)           Q(s)      =     699
                std cond.   (dscm/min)        Q(s)      =    19.8
                actual      (acfm)            Q(a)      =    3495
                actual      (acm/min)         Q(a)      =    99.0
Particulate Loading,  dry   (gr/dscf)         C(s std)  =  0.0100
                  @ 7% O2   (gr/dscf)         C(s std)  =  0.0101
                  @ 7% O2   (mg/dscm)         C(s std)  =      23
Particulate Emission Rate   (lb/hr)           E(p)      =   0.060
                            (kg/hr)           E(p)      =   0.027
-----------------------------------------------------------------
Stack Gas Water Vapor Proportion              B(wo)     =   0.067
Molecular Weight of Stack Gas, Dry            M(d)      =   29.74
                               Wet            M(s)      =   28.96
Stack Pressure, absolute (in Hg)              P(s)      =   29.89
Average Stack Velocity (ft/sec)               V(s avg)  =    34.2
```

```
----------------------------------------------------------------------------
Sample : dClock :Velocity: Orifice : Stack  :    Gas  Meter   :SQRT(dP) :FIELD DATA AVERAGES FOR SAMPLE # —— A09280931M5T1
 Point :  Time  :Head, dP:Meter,dH :  Temp  :   Temp  (degF)  :         :
       :  (min) :(in H2O):(in H2O) : (degF) :    in   :  out  :         :Velocity Head           ("wc)    dP(avg)  =   0.080
----------------------------------------------------------------------------:
     1 :    179 :   0.08 :    1.15 :   2000 :     132 :   113 :  0.2828 :Orifice Meter Reading   ("wc)    dH(avg)  =   1.150
     0 :      0 :      0 :       0 :      0 :       0 :     0 :  0.0000 :
  ——   :——      :——      :——       :——      :——       :——     :——       :Stack Temperature       (deg F)  T(s avg) =  2000.0
  ——   :——      :——      :——       :——      :——       :——     :——       :                        (deg C)  T(s avg) =  1093.3
  ——   :——      :——      :——       :——      :——       :——     :——       :
  ——   :——      :——      :——       :——      :——       :——     :——       :
  ——   :——      :——      :——       :——      :——       :——     :——       :Meter Temperature       (deg F)  T(m avg) =   122.5
  ——   :——      :——      :——       :——      :——       :——     :——       :                        (deg C)  T(m avg) =    50.3
  ——   :——      :——      :——       :——      :——       :——     :——       :
  ——   :——      :——      :——       :——      :——       :——     :——       :
  ——   :——      :——      :——       :——      :——       :——     :——       :Root-Mean-Square dP     ("wc)    SQRT(dP) =   0.283
  ——   :——      :——      :——       :——      :——       :——     :——       :
  ——   :——      :——      :——       :——      :——       :——     :——       :
  ——   :——      :——      :——       :——      :——       :——     :——       :
  ——   :——      :——      :——       :——      :——       :——     :——       :
  ——   :——      :——      :——       :——      :——       :——     :——       :
  ——   :——      :——      :——       :——      :——       :——     :——       :
  ——   :——      :——      :——       :——      :——       :——     :——       :
  ——   :——      :——      :——       :——      :——       :——     :——       :
----------------------------------------------------------------------------:
TOTALS :    179 :   0.08 :  1.1500 : 2000.0 :   132.0 : 113.0 :  0.2828 :
```

Test 2

```
ISOKINETIC RESULTS
 'ent:  CRF        Updated  9/21/88   Performed by:      C.KING
  .e:   09/28/88  Printed  10/03/88   Test No./Type:     A09280931MST2
Sample Location:  AFTERBURNER         Start/Stop Time:   0931-1230

PARAMETER                              SYMBOL     VALUE
                                                  (calc.)

Nozzle Diameter, Actual (in)           N(d)          0.52
Pitot Tube Correction Factor           C(p)          0.84
Gas Meter Correction Factor            (alpha)       1.02
Stack (Duct) Dimensions (in):
        Radius (if round)              R          ———
        Length (if rectangular)        L               20
        Width (if rectangular)         W            12.25
Area of Stack (sq ft)                  A(s)      (1.70138 )

# of Sample Points                     #                1
Total Sampling Time (min)              (theta)   ( 179.00 )
Barometric Pressure (in Hg)            P(b)          29.9
Stack Pressure (in H2O)                P(stack)     -0.08
Gas Meter Initial Reading (cu ft)                    8.325
Gas Meter Final Reading (cu ft)                    124.875
Net Gas Sample Volume (cu ft)          V(m)      ( 116.55 )

Vol of Liquid Collected (ml)           Vl(c)       176.42
Vol of Liq @ Std. Conds. (scf)         V(w std)  (  8.304 )
Wt. of Filter Particulate (gm)                          0
    of Probe Wash Particulate (gm)                      0
Wt. of Combined Particulate (gm)       M(p)      ( 0.0000 )

O2  Concentration (by CEM)             %              7.2
CO2 Concentration (by CEM)             %              9.1
CO  Concentration (by CEM)             %                0
N2  Concentration (by diff.)           %         (  83.70 )
```

```
CALCULATED RESULTS FOR SAMPLE # —— A09280931MST2

Isokineticity                                  % I          =   100.6
Metered Sample Gas Volume      (scf)           V(m std) =   106.69
                               (scm)           V(m std) =    3.078
Stack Gas Flow, std cond.      (dscfm)         Q(s)         =      657
                std cond.      (dscm/min)Q(s)               =     19.7
                actual         (acfm)          Q(a)         =     3458
                actual         (acm/min)  Q(a)              =     99.1
Particulate Loading,  dry      (gr/dscf) C(s std) =   0.0000
                      @ 7% O2(gr/dscf) C(s std) =   0.0000
                      @ 7% O2(mg/dscm) C(s std) =        0
Particulate Emission Rate      (lb/hr)   E(p)         =    0.000
                               (kg/hr)   E(p)         =    0.000
_____________________________________________________________

Stack Gas Water Vapor Proportion         B(wo)        =    0.071
Molecular Weight of Stack Gas, Dry       M(d)         =    29.74
                               Wet       M(s)         =    28.91
Stack Pressure, absolute (in Hg)         P(s)         =    29.89
Average Stack Velocity (ft/sec)          V(s avg) =     34.3
```

```
__________________________________________________________________________
Sample : dClock  :Velocity: Orifice :  Stack  :   Gas   Meter  :SQRT(dP) :FIELD DATA AVERAGES FOR SAMPLE # —— A09280931MST2
 Point :  Time   :Head, dP:Meter,dH :  Temp   :   Temp  (degF)  :         :
       :  (min)  :(in H2O):(in H2O) : (degF)  :   in   :  out   :         :Velocity Head           ("wc)     dP(avg)  =    0.080
__________________________________________________________________________:
     1 :     179 :   0.08 :    1.15 :    2000 :    130 :    107 :  0.2828 :Orifice Meter Reading   ("wc)     dH(avg)  =    1.150
     0 :       0 :      0 :       0 :       0 :      0 :      0 :  0.0000 :
  ——   :——       :——      :——       :——       :——      :——      :——       :Stack Temperature       (deg F)   T(s avg) =   2000.0
  ——   :——       :——      :——       :——       :——      :——      :——       :                        (deg C)   T(s avg) =   1053.3
  ——   :——       :——      :——       :——       :——      :——      :——       :
  ——   :——       :——      :——       :——       :——      :——      :——       :Meter Temperature       (deg F)   T(m avg) =    118.5
  ——   :——       :——      :——       :——       :——      :——      :——       :                        (deg C)   T(m avg) =     48.1
  ——   :——       :——      :——       :——       :——      :——      :——       :
  ——   :——       :——      :——       :——       :——      :——      :——       :Root-Mean-Square dP     ("wc)     SQRT(dP) =    0.283
  ——   :——       :——      :——       :——       :——      :——      :——       :
  ——   :——       :——      :——       :——       :——      :——      :——       :
  ——   :——       :——      :——       :——       :——      :——      :——       :
  ——   :——       :——      :——       :——       :——      :——      :——       :
   -   :——       :——      :——       :——       :——      :——      :——       :
   -   :——       :——      :——       :——       :——      :——      :——       :
  ——   :——       :——      :——       :——       :——      :——      :——       :
  ——   :——       :——      :——       :——       :——      :——      :——       :
  ——   :——       :——      :——       :——       :——      :——      :——       :
  ——   :——       :——      :——       :——       :——      :——      :——       :
__________________________________________________________________________:
TOTALS :     179 :   0.08 :  1.1500 :  2000.0 :  130.0 :  107.0 :  0.2828 :
```

```
ISOKINETIC RESULTS
  t:  CRF        Updated  9/23/88   Performed by:     M.VESTAL
...e:  09/28/88  Printed  10/03/88  Test No./Type:    E09260940MST1
Sample Location:  SCRUBBER OUTLET   Start/Stop Time:  0340-1200

                                         SYMBOL     VALUE
PARAMETER                                           (calc.)

Nozzle Diameter, Actual (in)             N(d)        0.357
Pitot Tube Correction Factor             C(p)        0.84
Gas Meter Correction Factor              (alpha)     0.99
Stack (Duct) Dimensions (in):
        Radius (if round)                R              7
        Length (if rectangular)          L           ——
        Width (if rectangular)           W           ——
Area of Stack (sq ft)                    A(s)      (1.06901 )

# of Sample Points                       #              9
Total Sampling Time (min)                (theta)   ( 135.00 )
Barometric Pressure (in Hg)              P(b)         29.9
Stack Pressure (in H2O)                  P(stack)       -2
Gas Meter Initial Reading (cu ft)                  125.991
Gas Meter Final Reading (cu ft)                    247.101
Net Gas Sample Volume (cu ft)            V(m)      ( 121.11 )

Vol of Liquid Collected (ml)             Vl(c)     1626.98
Vol of Liq @ Std. Conds. (scf)           V(w std)  ( 76.562 )
Wt  of Filter Particulate (gm)                      0.0644
    of Probe Wash Particulate (gm)                       0
Wt of Combined Particulate (gm)          M(p)      ( 0.0644 )

O2  Concentration (by CEM)               %            12.1
CO2 Concentration (by CEM)               %             7.7
CO  Concentration (by CEM)               %               0
N2  Concentration (by diff.)             %         (  80.20 )
```

```
CALCULATED RESULTS FOR SAMPLE # —— E09280940MST1

Isokineticity                                % I       =   106.5
Metered Sample Gas Volume    (scf)           V(m std)  =  112.66
                             (scm)           V(m std)  =   3.190
Stack Gas Flow, std cond.    (dscfm)         Q(s)      =    1184
                std cond.    (dscm/min)      Q(s)      =    33.5
                actual       (acfm)          Q(a)      =    2371
                actual       (acm/min)       Q(a)      =    67.1
Particulate Loading,  dry    (gr/dscf)       C(s std)  =  0.0068
                  @ 7% O2    (gr/dscf)       C(s std)  =  0.0139
                  @ 7% O2    (mg/dscm)       C(s std)  =      32
Particulate Emission Rate    (lb/hr)         E(p)      =   0.089
                             (kg/hr)         E(p)      =   0.041
________________________________________________________________
Stack Gas Water Vapor Proportion             B(wo)     =   0.405
Molecular Weight of Stack Gas, Dry           M(d)      =   29.72
                               Wet           M(s)      =   24.97
Stack Pressure, absolute (in Hg)             P(s)      =   25.75
Average Stack Velocity (ft/sec)              V(s avg)  =    37.0
```

```
______________________________________________________________________________
Sample | dClock  |Velocity| Orifice |  Stack  |    Gas   Meter   |SQRT(dP)
 Point |  Time   |Head, dP|Meter,dH |  Temp   |   Temp   (degF)  |
       |  (min)  |(in H2O)|(in H2O) | (degF)  |    in   |  out   |
______________________________________________________________________________
    1  |     15  |  0.32  |    2.6  |    166  |     84  |    70  |  0.5657
    2  |     15  |  0.32  |    2.6  |    166  |    109  |    78  |  0.5657
    3  |     15  |  0.32  |    2.6  |    166  |    115  |    86  |  0.5657
    4  |     15  |  0.32  |    2.6  |    166  |    122  |    94  |  0.5657
    4  |     15  |  0.31  |    2.5  |    166  |    115  |    96  |  0.5568
    3  |     15  |  0.31  |    2.5  |    166  |    126  |   100  |  0.5568
    2  |     15  |  0.31  |    2.5  |    166  |    126  |   101  |  0.5568
    1  |     15  |  0.31  |    2.5  |    166  |    128  |   103  |  0.5568
    4  |     15  |  0.31  |    2.5  |    166  |    130  |   104  |  0.5568
  ——   |——       |——      |——       |——       |——       |——      |——
  ——   |——       |——      |——       |——       |——       |——      |——
  ——   |——       |——      |——       |——       |——       |——      |——
  ——   |——       |——      |——       |——       |——       |——      |——
   -   |——       |——      |——       |——       |——       |——      |——
   -   |——       |——      |——       |——       |——       |——      |——
  ——   |——       |——      |——       |——       |——       |——      |——
  ——   |——       |——      |——       |——       |——       |——      |——
  ——   |——       |——      |——       |——       |——       |——      |——
  ——   |——       |——      |——       |——       |——       |——      |——
______________________________________________________________________________
TOTALS |    135  |  2.83  | 22.9000 | 1494.0  | 1055.0  | 832.0  | 5.0466
```

```
|FIELD DATA AVERAGES FOR SAMPLE # —— E09280940MST1
|
|Velocity Head              ("wc)     dP(avg)   =   0.314
|
|Orifice Meter Reading      ("wc)     dH(avg)   =   2.544
|
|Stack Temperature          (deg F)   T(s avg)  =   166.0
|                           (deg C)   T(s avg)  =    74.4
|
|Meter Temperature          (deg F)   T(m avg)  =   104.8
|                           (deg C)   T(m avg)  =    40.5
|
|Root-Mean-Square dP        ("wc)     SQRT(dP)  =   0.561
```

```
ISOKINETIC RESULTS                                                    CALCULATED RESULTS FOR SAMPLE # --  E09280940M5T2
  ent:  CRF       Updated  9/23/88   Performed by:      W.VESTAL
   #:   05/28/88  Printed  10/03/88  Test No./Type:     E09280940M5T2   Isokineticity                         % I       =   103.0
Sample Location:  SCRUBBER OUTLET    Start/Stop Time:   0940-1200       Metered Sample Gas Volume  (scf)      V(m std) =  112.21
                                                                                                   (scm)      V(m std) =   3.177
PARAMETER                               SYMBOL    VALUE                 Stack Gas Flow, std cond.  (dscfm)    Q(s)     =    1174
                                                  (calc.)                               std cond.  (dscm/min)Q(s)      =    33.2
Nozzle Diameter, Actual (in)            N(d)        0.357                               actual     (acfm)     Q(a)     =    2374
Pitot Tube Correction Factor            C(p)        0.84                                actual     (acm/min)  Q(a)     =    67.2
Gas Meter Correction Factor             (alpha)     1.03                Particulate Loading,  dry  (gr/dscf)  C(s std) =  0.0000
Stack (Duct) Dimensions (in):                                                        @ 7% O2(gr/dscf)     C(s std) =  0.0000
       Radius (if round)                R              7                                 @ 7% O2(mg/dscm)     C(s std) =       0
       Length (if rectangular)          L           ---                 Particulate Emission Rate  (lb/hr)    E(p)     =   0.000
       Width (if rectangular)           W           ---                                            (kg/hr)    E(p)     =   0.000
Area of Stack (sq ft)                   A(s)     (1.06901 )             ---------------------------------------------------------
                                                                        Stack Gas Water Vapor Proportion      B(wo)    =   0.410
# of Sample Points                      #              9                Molecular Weight of Stack Gas, Dry    M(d)     =   29.72
Total Sampling Time (min)               (theta)  ( 135.00 )                                            Wet    M(s)     =   24.91
Barometric Pressure (in Hg)             P(b)        29.9                Stack Pressure, absolute (in Hg)      P(s)     =   29.75
Stack Pressure (in H2O)                 P(stack)      -2                Average Stack Velocity (ft/sec)       V(s avg) =    37.0
Gas Meter Initial Reading (cu ft)                 544.789
Gas Meter Final Reading (cu ft)                   661.125
Net Gas Sample Volume (cu ft)           V(m)     ( 116.34 )

Vol of Liquid Collected (ml)            Vl(c)     1658.62
Vol of Liq @ Std. Conds. (scf)          V(w std) ( 78.071 )
Wt. of Filter Particulate (gm)                         0
   of Probe Wash Particulate (gm)                      0
wt of Combined Particulate (gm)         M(p)     ( 0.0000 )

O2  Concentration (by CEM)              %           12.1
CO2 Concentration (by CEM)              %            7.7
CO  Concentration (by CEM)              %              0
N2  Concentration (by diff.)            %        (  80.20 )
------------------------------------------------------------------------
Sample : dClock  :Velocity: Orifice  :  Stack  :    Gas  Meter  :SQRT(dP) :FIELD DATA AVERAGES FOR SAMPLE # --  E09280940M5T2
 Point :  Time   :Head, dP:Meter,dH  :  Temp   :   Temp  (degF) :         :
       :  (min)  :(in H2O):(in H2O)  : (degF)  :   in   :  out  :         :Velocity Head          ("wc)      dP(avg)  =   0.314
-------+---------+--------+----------+---------+--------+-------+---------:
     1 :      15 :  0.32  :      2.6 :     166 :     80 :    70 : 0.5657 :Orifice Meter Reading   ("wc)      dH(avg)  =   2.544
     2 :      15 :  0.32  :      2.6 :     166 :    110 :    78 : 0.5657 :
     3 :      15 :  0.32  :      2.6 :     166 :    118 :    88 : 0.5657 :Stack Temperature      (deg F)    T(s avg) =   166.0
     4 :      15 :  0.32  :      2.6 :     166 :    122 :    95 : 0.5657 :                       (deg C)    T(s avg) =    74.4
     4 :      15 :  0.31  :      2.5 :     166 :    120 :   100 : 0.5568 :
     3 :      15 :  0.31  :      2.5 :     166 :    129 :   103 : 0.5568 :Meter Temperature      (deg F)    T(m avg) =   106.8
     2 :      15 :  0.31  :      2.5 :     166 :    129 :   105 : 0.5568 :                       (deg C)    T(m avg) =    41.5
     1 :      15 :  0.31  :      2.5 :     166 :    130 :   107 : 0.5568 :
     4 :      15 :  0.31  :      2.5 :     166 :    130 :   108 : 0.5568 :Root-Mean-Square dP     ("wc)      SQRT(dP) =   0.561
  ---  :---      :---     :---       :---      :---     :---    :---      :
  ---  :---      :---     :---       :---      :---     :---    :---      :
  ---  :---      :---     :---       :---      :---     :---    :---      :
  ---  :---      :---     :---       :---      :---     :---    :---      :
    -  :---      :---     :---       :---      :---     :---    :---      :
    -  :---      :---     :---       :---      :---     :---    :---      :
  ---  :---      :---     :---       :---      :---     :---    :---      :
  ---  :---      :---     :---       :---      :---     :---    :---      :
  ---  :---      :---     :---       :---      :---     :---    :---      :
  ---  :---      :---     :---       :---      :---     :---    :---      :
-------+---------+--------+----------+---------+--------+-------+---------:
TOTALS :     135 :   2.83 : 22.9000  :  1494.0 : 1068.0 : 854.0 : 5.0466  :
```

```
ISOKINETIC RESULTS
P   t: CRF        Updated  9/23/88   Performed by:      J.MILLS
.   .:  9/28/88   Printed  10/03/88  Test No./Type:     S09280945M5
Sample Location:  STACK                Start/Stop Time:   0954-1054

                                         SYMBOL      VALUE
PARAMETER                                            (calc.)

Nozzle Diameter, Actual (in)             N(d)         0.357
Pitot Tube Correction Factor             C(p)         0.84
Gas Meter Correction Factor              (alpha)         1
Stack (Duct) Dimensions (in):
        Radius (if round)                R               7
        Length (if rectangular)          L           ___
        Width (if rectangular)           W           ___
Area of Stack (sq ft)                    A(s)      (1.06901 )

# of Sample Points                       #              12
Total Sampling Time (min)                (theta)   (  60.00 )
Barometric Pressure (in Hg)              P(b)         29.9
Stack Pressure (in H2O)                  P(stack)    -0.08
Gas Meter Initial Reading (cu ft)                    70.074
Gas Meter Final Reading (cu ft)                     121.944
Net Gas Sample Volume (cu ft)            V(m)      (  51.87 )

Vol of Liquid Collected (ml)             Vl(c)      474.65
Vol of Liq @ Std. Conds. (scf)           V(w std)  ( 22.342 )
Wt. of Filter Particulate (gm)                        0.037
    of Probe Wash Particulate (gm)                        0
Wt of Combined Particulate (gm)          M(p)      ( 0.0370 )

O2  Concentration (by CEM)               %             12.1
CO2 Concentration (by CEM)               %              7.7
CO  Concentration (by CEM)               %                0
N2  Concentration (by diff.)             %         (  80.20 )
```

```
CALCULATED RESULTS FOR SAMPLE # --  S09280945M5

Isokineticity                                  % I        =    96.5
Metered Sample Gas Volume   (scf)              V(m std)  =    49.32
                            (scm)              V(m std)  =    1.397
Stack Gas Flow, std cond.   (dscfm)            Q(s)      =     1312
                std cond.   (dscm/min)         Q(s)      =     37.1
                actual      (acfm)             Q(a)      =     2261
                actual      (acm/min)          Q(a)      =     64.0
Particulate Loading,  dry   (gr/dscf)          C(s std)  =   0.0116
                 @ 7% O2(gr/dscf)              C(s std)  =   0.0182
                 @ 7% O2(mg/dscm)              C(s std)  =       42
Particulate Emission Rate   (lb/hr)            E(p)      =    0.130
                            (kg/hr)            E(p)      =    0.059
________________________________________________________________________
Stack Gas Water Vapor Proportion               B(wo)     =    0.312
Molecular Weight of Stack Gas, Dry             M(d)      =    29.72
                               Wet             M(s)      =    26.06
Stack Pressure, absolute (in Hg)               P(s)      =    29.89
Average Stack Velocity (ft/sec)                V(s avg)  =     35.3
```

```
______________________________________________________________________________
Sample : dClock  :Velocity: Orifice  :  Stack  :    Gas   Meter   :SQRT(dP) :FIELD DATA AVERAGES FOR SAMPLE # --  S09280945M5
 Point :  Time   :Head, dP:Meter,dH  :  Temp   :    Temp  (degF)  :         :
       :  (min)  :(in H2O):(in H2O)  : (degF)  :     in  :  out   :         :Velocity Head           ("wc)     dP(avg)  =  0.300
-------+---------+--------+----------+---------+---------+--------+---------:
     1 :       5 :    0.3 :     2.46 :     166 :      79 :     72 :  0.5477 :Orifice Meter Reading   ("wc)     dH(avg)  =  2.460
     2 :       5 :    0.3 :     2.46 :     166 :      94 :     73 :  0.5477 :
     3 :       5 :    0.3 :     2.46 :     166 :     100 :     75 :  0.5477 :Stack Temperature       (deg F)   T(s avg) =  166.0
     4 :       5 :    0.3 :     2.46 :     166 :     109 :     78 :  0.5477 :                        (deg C)   T(s avg) =   74.4
     5 :       5 :    0.3 :     2.46 :     166 :     114 :     82 :  0.5477 :
     6 :       5 :    0.3 :     2.46 :     166 :     116 :     84 :  0.5477 :Meter Temperature       (deg F)   T(m avg) =   98.1
     1 :       5 :    0.3 :     2.46 :     166 :     119 :     86 :  0.5477 :                        (deg C)   T(m avg) =   36.7
     2 :       5 :    0.3 :     2.46 :     166 :     121 :     88 :  0.5477 :
     3 :       5 :    0.3 :     2.46 :     166 :     122 :     90 :  0.5477 :Root-Mean-Square dP     ("wc)     SQRT(dP) =  0.548
     4 :       5 :    0.3 :     2.46 :     166 :     123 :     92 :  0.5477 :
     5 :       5 :    0.3 :     2.46 :     166 :     124 :     94 :  0.5477 :
     6 :       5 :    0.3 :     2.46 :     166 :     125 :     94 :  0.5477 :
   ___ :___      :___     :___       :___      :___      :___     :___      :
   ___ :___      :___     :___       :___      :___      :___     :___      :
       :___      :___     :___       :___      :___      :___     :___      :
       :___      :___     :___       :___      :___      :___     :___      :
   ___ :___      :___     :___       :___      :___      :___     :___      :
   ___ :___      :___     :___       :___      :___      :___     :___      :
   ___ :___      :___     :___       :___      :___      :___     :___      :
   ___ :___      :___     :___       :___      :___      :___     :___      :
-------+---------+--------+----------+---------+---------+--------+---------:
TOTALS :      60 :   3.60 :  29.5200 :  1992.0 :  1346.0 : 1008.0 :  6.5727 :
```

```
ISOKINETIC RESULTS
" #:  CRF        Updated  9/21/88   Performed by:       C.KING
  #:  09/29/88   Printed  10/03/88  Test No./Type:      A09290907MST1
Sample Location:  AFTERBURNER       Start/Stop Time:    0907-1157

PARAMETER                            SYMBOL      VALUE
                                                (calc.)

Nozzle Diameter, Actual (in)         N(d)          0.52
Pitot Tube Correction Factor         C(p)          0.84
Gas Meter Correction Factor          (alpha)       0.97
Stack (Duct) Dimensions (in):
        Radius (if round)            R           ——
        Length (if rectangular)      L               20
        Width (if rectangular)       W            12.25
Area of Stack (sq ft)                A(s)       (1.70138 )

# of Sample Points                   #                1
Total Sampling Time (min)            (theta)    ( 180.00 )
Barometric Pressure (in Hg)          P(b)            30
Stack Pressure (in H2O)              P(stack)     -0.08
Gas Meter Initial Reading (cu ft)                199.01
Gas Meter Final Reading (cu ft)                 317.645
Net Gas Sample Volume (cu ft)        V(m)       ( 118.63 )

Vol of Liquid Collected (ml)         Vl(c)       166.87
Vol of Liq @ Std. Conds. (scf)       V(w std) (  7.349 )
Wt. of Filter Particulate (gm)                    0.059
    of Probe Wash Particulate (gm)                    0
Wt. of Combined Particulate (gm)     m(n)       ( 0.0590 )

O2  Concentration (by CEM)           %             7.35
CO2 Concentration (by CEM)           %              9.1
CO  Concentration (by CEM)           %                0
N2  Concentration (by diff.)         %          (  83.55 )
```

```
CALCULATED RESULTS FOR SAMPLE # —— A09290907MST1

Isokineticity                                   % I        =    94.8
Metered Sample Gas Volume    (scf)              V(m std) =  103.16
                             (scm)              V(m std) =   2.921
Stack Gas Flow, std cond.    (dscfm)            Q(s)       =     658
                std cond.    (dscm/min)         Q(s)       =    19.8
                actual       (acfm)             Q(a)       =    3452
                actual       (acm/min)          Q(a)       =    98.9
Particulate Loading,  dry    (gr/dscf)          C(s std) =  0.0068
               @ 7% O2(gr/dscf)                 C(s std) =  0.0091
               @ 7% O2(mg/dscm)                 C(s std) =      21
Particulate Emission Rate    (lb/hr)            E(p)       =   0.053
                             (kg/hr)            E(p)       =   0.024
______________________________________________________________________

Stack Gas Water Vapor Proportion                B(wo)      =   0.072
Molecular Weight of Stack Gas, Dry              M(d)       =   29.75
                               Wet              M(s)       =   28.91
Stack Pressure, absolute (in Hg)                P(s)       =   29.99
Average Stack Velocity (ft/sec)                 V(s avg) =    34.2
```

```
________________________________________________________________________________
Sample : dClock :Velocity: Orifice :  Stack  :    Gas  Meter   :SQRT(dP) :FIELD DATA AVERAGES FOR SAMPLE # —— A09290907MST1
 Point :  Time  :Head, dP:Meter,dH :  Temp   :   Temp  (degF)  :         :
       :  (min) :(in H2O):(in H2O) : (degF)  :    in   :  out  :         :Velocity Head            ("wc)      dP(avg)  =   0.080
________________________________________________________________________________:
     1 :    180 :   0.08 :    1.15 :    2000 :     141 :   123 :  0.2828 :Orifice Meter Reading    ("wc)      dH(avg)  =   1.150
     0 :      0 :      0 :       0 :       0 :       0 :     0 :  0.0000 :
 ——    :——      :——      :——       :——       :——       :——     :——       :Stack Temperature        (deg F)    T(s avg) =  2000.0
 ——    :——      :——      :——       :——       :——       :——     :——       :                         (deg C)    T(s avg) =  1092.3
 ——    :——      :——      :——       :——       :——       :——     :——       :
 ——    :——      :——      :——       :——       :——       :——     :——       :Meter Temperature        (deg F)    T(m avg) =   132.0
 ——    :——      :——      :——       :——       :——       :——     :——       :                         (deg C)    T(m avg) =    55.6
 ——    :——      :——      :——       :——       :——       :——     :——       :
 ——    :——      :——      :——       :——       :——       :——     :——       :Root-Mean-Square dP      ("wc)      SQRT(dP) =   0.283
 ——    :——      :——      :——       :——       :——       :——     :——       :
 ——    :——      :——      :——       :——       :——       :——     :——       :
 ——    :——      :——      :——       :——       :——       :——     :——       :
 ——    :——      :——      :——       :——       :——       :——     :——       :
 ——    :——      :——      :——       :——       :——       :——     :——       :
  .    :——      :——      :——       :——       :——       :——     :——       :
 ——    :——      :——      :——       :——       :——       :——     :——       :
 ——    :——      :——      :——       :——       :——       :——     :——       :
 ——    :——      :——      :——       :——       :——       :——     :——       :
 ——    :——      :——      :——       :——       :——       :——     :——       :
________________________________________________________________________________:
TOTALS :    180 :   0.08 :  1.1500 :  2000.0 :   141.0 : 123.0 :  0.2828 :
```

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ISOKINETIC RESULTS
  ent:  CRF      Updated  9/21/88  Performed by:      C.KING
  .e:  09/25/88  Printed  10/03/88  Test No./Type:    A05290907MST2
Sample Location:  AFTERBURNER       Start/Stop Time:  0907-1157

PARAMETER                          SYMBOL    VALUE
                                             (calc.)

Nozzle Diameter, Actual (in)       N(d)        0.52
Pitot Tube Correction Factor       C(p)        0.84
Gas Meter Correction Factor        (alpha)     1.02
Stack (Duct) Dimensions (in):
       Radius (if round)           R         ----
       Length (if rectangular)     L            20
       Width (if rectangular)      W         12.25
Area of Stack (sq ft)              A(s)    (1.70138 )

# of Sample Points                 #             1
Total Sampling Time (min)          (theta)  ( 180.00 )
Barometric Pressure (in Hg)        P(b)         30
Stack Pressure (in H2O)            P(stack)  -0.08
Gas Meter Initial Reading (cu ft)           125.973
Gas Meter Final Reading (cu ft)             235.355
Net Gas Sample Volume (cu ft)      V(m)     ( 109.38 )

Vol of Liquid Collected (ml)       Vl(c)      161.01
Vol of Liq @ Std. Conds. (scf)     Vw std)  (  7.579 )
Wt. of Filter Particulate (gm)                   0
    of Probe Wash Particulate (gm)               0
 .. of Combined Particulate (gm)   m(p)     ( 0.0000 )

O2  Concentration (by CEM)         %           7.35
CO2 Concentration (by CEM)         %           9.1
CO  Concentration (by CEM)         %             0
N2  Concentration (by diff.)       %        (  83.55 )
```

```
CALCULATED RESULTS FOR SAMPLE # --  A05290907MST2

Isokineticity                              % I       =    92.7
Metered Sample Gas Volume  (scf)           V(m std) =   100.95
                           (scm)           V(m std) =    2.859
Stack Gas Flow, std cond.  (dscfm)         Q(s)     =      699
                std cond.  (dscm/min)      Q(s)     =     19.8
                actual     (acfm)          Q(a)     =     3491
                actual     (acm/min)       Q(a)     =     98.9
Particulate Loading,  dry  (gr/dscf)       C(s std) =   0.0000
                   @ 7% O2(gr/dscf)        C(s std) =   0.0000
                   @ 7% O2(mg/dscm)        C(s std) =        0
Particulate Emission Rate  (lb/hr)         E(p)     =    0.000
                           (kg/hr)         E(p)     =    0.000
---------------------------------------------------------------
Stack Gas Water Vapor Proportion           B(wo)    =    0.070
Molecular Weight of Stack Gas, Dry         M(d)     =    29.75
                              Wet          M(s)     =    28.93
Stack Pressure, absolute (in Hg)           P(s)     =    29.99
Average Stack Velocity (ft/sec)            V(s avg) =     34.2
```

```
-------------------------------------------------------------------------------
Sample : eClock  :Velocity: Orifice :  Stack  :   Gas   Meter  :SQRT(dP) :FIELD DATA AVERAGES FOR SAMPLE # --  A05290907MST2
 Point :  Time   :Head, dP:Meter,dH :  Temp   :   Temp  (degF) :         :
       :  (min)  :(in H2O):(in H2O) : (degF)  :   in   :  out  :         :Velocity Head          ("wc)      dP(avg)  =   0.080
-------------------------------------------------------------------------:
     1 :     180 :   0.08 :    1.15 :    2000 :    138 :   115 :  0.2828 :Orifice Meter Reading  ("wc)      dH(avg)  =   1.150
     0 :       0 :      0 :       0 :       0 :      0 :     0 :  0.0000 :
 ----  :----     :----    :----     :----     :----    :----   :----     :Stack Temperature      (deg F)    T(s avg) =  2000.0
 ----  :----     :----    :----     :----     :----    :----   :----     :                       (deg C)    T(s avg) =  1093.3
 ----  :----     :----    :----     :----     :----    :----   :----     :
 ----  :----     :----    :----     :----     :----    :----   :----     :Meter Temperature      (deg F)    T(m avg) =   126.5
 ----  :----     :----    :----     :----     :----    :----   :----     :                       (deg C)    T(m avg) =    52.5
 ----  :----     :----    :----     :----     :----    :----   :----     :
 ----  :----     :----    :----     :----     :----    :----   :----     :Root-Mean-Square dP    ("wc)      SQRT(dP) =   0.283
 ----  :----     :----    :----     :----     :----    :----   :----     :
 ----  :----     :----    :----     :----     :----    :----   :----     :
 ----  :----     :----    :----     :----     :----    :----   :----     :
 ----  :----     :----    :----     :----     :----    :----   :----     :
    -  :----     :----    :----     :----     :----    :----   :----     :
 ----  :----     :----    :----     :----     :----    :----   :----     :
 ----  :----     :----    :----     :----     :----    :----   :----     :
 ----  :----     :----    :----     :----     :----    :----   :----     :
 ----  :----     :----    :----     :----     :----    :----   :----     :
-------------------------------------------------------------------------:
TOTALS :     180 :   0.08 :  1.1500 :  2000.0 :  138.0 : 115.0 :  0.2828 :
```

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ISOKINETIC RESULTS
   nt:  CRF        Updated  9/23/88   Performed by:      W.VESTAL
   e:   09/29/88   Printed  10/03/88  Test No./Type:     E09290920MST1
Sample Location:  SCRUBBER OUTLET     Start/Stop Time:   0920-1141

PARAMETER                               SYMBOL    VALUE
                                                  (calc.)

Nozzle Diameter, Actual (in)            N(d)       0.357
Pitot Tube Correction Factor            C(p)       0.84
Gas Meter Correction Factor             (alpha)    0.99
Stack (Duct) Dimensions (in):
      Radius (if round)                 R             7
      Length (if rectangular)           L         ——
      Width (if rectangular)            W         ——
Area of Stack (sq ft)                   A(s)     (1.06901 )

# of Sample Points                      #             8
Total Sampling Time (min)               (theta)  ( 136.00 )
Barometric Pressure (in Hg)             P(b)         30
Stack Pressure (in H2O)                 P(stack)     -2
Gas Meter Initial Reading (cu ft)                247.924
Gas Meter Final Reading (cu ft)                   368.14
Net Gas Sample Volume (cu ft)           V(m)     ( 120.22 )

Vol of Liquid Collected (ml)            Vl(c)    1530.36
Vol of Liq @ Std. Conds. (scf)          V(w std) ( 72.034 )
Wt. of Filter Particulate (gm)                     0.065
   of Probe Wash Particulate (gm)                      0
 t of Combined Particulate (gm)         M(n)     ( 0.0650 )

O2  Concentration (by CEM)              %          11.87
CO2 Concentration (by CEM)              %            8.2
CO  Concentration (by CEM)              %              0
N2  Concentration (by diff.)            %        (  79.93 )
```

```
CALCULATED RESULTS FOR SAMPLE # —  E09290920MST1

Isokineticity                                % I        =   104.6
Metered Sample Gas Volume   (scf)            V(m std) =  112.79
                            (scm)            V(m std) =   3.194
Stack Gas Flow. std cond.   (dscfm)          Q(s)     =    1221
                std cond.   (dscm/min)Q(s)            =    34.6
                actual      (acfm)           Q(a)     =    2377
                actual      (acm/min)        Q(a)     =    67.3
Particulate Loading,  dry   (gr/dscf)        C(s std) =  0.0069
                   @ 7% O2(gr/dscf)          C(s std) =  0.0136
                   @ 7% O2(mg/dscm)          C(s std) =      31
Particulate Emission Rate   (lb/hr)          E(p)     =   0.093
                            (kg/hr)          E(p)     =   0.042
_____________________________________________________________________

Stack Gas Water Vapor Proportion             B(wo)    =   0.390
Molecular Weight of Stack Gas, Dry           M(d)     =   29.79
                               Wet           M(s)     =   25.19
Stack Pressure, absolute (in Hg)             P(s)     =   29.85
Average Stack Velocity (ft/sec)              V(s avg) =    37.1
```

```
Sample ! dClock  !Velocity! Orifice ! Stack  !    Gas  Meter  !SQRT(dP) !FIELD DATA AVERAGES FOR SAMPLE # —  E09290920MST1
Point  !  Time   !Head. dP!Meter,dH ! Temp   !    Temp  (degF)!         !
       !  (min)  !(in H2O)!(in H2O) ! (degF) !  in   !  out   !         !Velocity Head           ("wc)      dP(avg)  =  0.320
-------+---------+--------+---------+--------+-------+--------+---------!
     1 !      17 !  0.32 !      2.6 !    166 !    81 !     70 !  0.5657 !Orifice Meter Reading   ("wc)      dH(avg)  =  2.600
     2 !      17 !  0.32 !      2.6 !    166 !   110 !     80 !  0.5657 !
     3 !      17 !  0.32 !      2.6 !    166 !   118 !     90 !  0.5657 !Stack Temperature       (deg F)    T(s avg) =  166.0
     4 !      17 !  0.32 !      2.6 !    166 !   119 !     94 !  0.5657 !                        (deg C)    T(s avg) =   74.4
     4 !      17 !  0.32 !      2.6 !    166 !   111 !     95 !  0.5657 !
     3 !      17 !  0.32 !      2.6 !    166 !   121 !     97 !  0.5657 !Meter Temperature       (deg F)    T(m avg) =  101.9
     2 !      17 !  0.32 !      2.6 !    166 !   122 !     98 !  0.5657 !                        (deg C)    T(m avg) =   38.9
     1 !      17 !  0.32 !      2.6 !    166 !   125 !    100 !  0.5657 !
     0 !       0 !     0 !        0 !      0 !     0 !      0 !  0.0000 !Root-Mean-Square dP     ("wc)      SQRT(dP) =  0.566
     0 !       0 !——     !——        !——      !——     !——      !——       !
——     !——       !——     !——        !——      !——     !——      !——       !
——     !——       !——     !——        !——      !——     !——      !——       !
——     !——       !——     !——        !——      !——     !——      !——       !
——     !——       !——     !——        !——      !——     !——      !——       !
       !——       !——     !——        !——      !——     !——      !——       !
——     !——       !——     !——        !——      !——     !——      !——       !
——     !——       !——     !——        !——      !——     !——      !——       !
——     !——       !——     !——        !——      !——     !——      !——       !
——     !——       !——     !——        !——      !——     !——      !——       !
-------+---------+--------+---------+--------+-------+--------+---------!
TOTALS !     136 !  2.56 ! 20.8000 ! 1328.0 ! 907.0 !  724.0 !  4.5255 !
```

Test 1

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ISOKINETIC RESULTS                                                CALCULATED RESULTS FOR SAMPLE # --  E09290920M5T2
 ''ant:  CRF        Updated  9/23/88  Performed by:      M.VESTAL
   .e:   09/29/88   Printed  10/03/88 Test No./Type:     E09290920M5T2   Isokineticity                         % I       =  107.0
. Sample Location:  SCRUBBER OUTLET   Start/Stop Time:   0920-1141       Metered Sample Gas Volume  (scf)      V(m std) =  113.34
                                                                                                    (scm)      V(m std) =   3.209
PARAMETER                             SYMBOL    VALUE                    Stack Gas Flow, std cond.  (dscfm)    Q(s)     =    1198
                                                (calc.)                                  std cond.  (dscm/min)Q(s)      =    33.9
                                                                                         actual     (acfm)     Q(a)     =    2383
Nozzle Diameter, Actual (in)          N(d)       0.357                                   actual     (acm/min)  Q(a)     =    67.5
Pitot Tube Correction Factor          C(p)       0.84                    Particulate Loading,  dry  (gr/dscf)  C(s std) =  0.0000
Gas Meter Correction Factor           (alpha)    1.03                                 @ 7% O2(gr/dscf)         C(s std) =  0.0000
Stack (Duct) Dimensions (in):                                                         @ 7% O2(mg/dscm)         C(s std) =       0
        Radius (if round)             R               7                  Particulate Emission Rate  (lb/hr)    E(p)     =   0.000
        Length (if rectangular)       L         ___                                                 (kg/hr)    E(p)     =   0.000
        Width (if rectangular)        W         ___                      ___________________________________________________________
Area of Stack (sq ft)                 A(s)      (1.06901 )
                                                                         Stack Gas Water Vapor Proportion      B(wo)    =   0.404
# of Sample Points                    #               8                  Molecular Weight of Stack Gas, Dry    M(d)     =   29.68
Total Sampling Time (min)             (theta)   ( 136.00 )                                              Wet    M(s)     =   24.96
Barometric Pressure (in Hg)           P(b)           30
Stack Pressure (in H2O)               P(stack)       -2                  Stack Pressure, absolute (in Hg)      P(s)     =   29.85
Gas Meter Initial Reading (cu ft)               661.489                  Average Stack Velocity (ft/sec)       V(s avg) =    37.2
Gas Meter Final Reading (cu ft)                 778.443
Net Gas Sample Volume (cu ft)         V(m)      ( 116.95 )

Vol of Liquid Collected (ml)          Vl(c)      1630.6
Vol of Liq @ Std. Conds. (scf)        V(w std)  ( 76.752 )
Wt. of Filter Particulate (gm)                        0
    of Probe Wash Particulate (gm)                    0
 -t of Combined Particulate (gm)      M(p)      ( 0.0000 )

O2  Concentration (by CEM)            %           11.57
CO2 Concentration (by CEM)            %             7.5
CO  Concentration (by CEM)            %               0
N2  Concentration (by diff.)          %         (  80.53 )
_______________________________________________________________________
Sample | dClock  |Velocity| Orifice |  Stack  |   Gas  Meter  |SQRT(dP) |FIELD DATA AVERAGES FOR SAMPLE # --  E09290920M5T2
 Point |  Time   |Head, dP|Meter,dH |  Temp   |  Temp  (degF) |         |
       |  (min)  |(in H2O)|(in H2O) | (degF)  |   in  |  out  |         |Velocity Head             ("wc)    dP(avg)   =   0.320
-------+---------+--------+---------+---------+-------+-------+---------|
     1 |      17 |   0.32 |     2.6 |     166 |    80 |    70 |  0.5657 |Orifice Meter Reading     ("wc)    dH(avg)   =   2.600
     2 |      17 |   0.32 |     2.6 |     166 |   109 |    81 |  0.5657 |
     3 |      17 |   0.32 |     2.6 |     166 |   123 |    94 |  0.5657 |Stack Temperature         (deg F)  T(s avg)  =   166.0
     4 |      17 |   0.32 |     2.6 |     166 |   125 |    99 |  0.5657 |                          (deg C)  T(s avg)  =    74.4
     4 |      17 |   0.32 |     2.6 |     166 |   114 |   101 |  0.5657 |
     3 |      17 |   0.32 |     2.6 |     166 |   127 |   104 |  0.5657 |Meter Temperature         (deg F)  T(m avg)  =   106.1
     2 |      17 |   0.32 |     2.6 |     166 |   128 |   105 |  0.5657 |                          (deg C)  T(m avg)  =    41.1
     1 |      17 |   0.32 |     2.6 |     166 |   130 |   107 |  0.5657 |
     0 |       0 |      0 |       0 |       0 |     0 |     0 |  0.0000 |Root-Mean-Square dP       ("wc)    SQRT(dP)  =   0.566
     0 |___      |___     |___      |___      |___    |___    |___      |
  ___  |___      |___     |___      |___      |___    |___    |___      |
  ___  |___      |___     |___      |___      |___    |___    |___      |
  ___  |___      |___     |___      |___      |___    |___    |___      |
  ___  |___      |___     |___      |___      |___    |___    |___      |
    -  |___      |___     |___      |___      |___    |___    |___      |
  ___  |___      |___     |___      |___      |___    |___    |___      |
  ___  |___      |___     |___      |___      |___    |___    |___      |
  ___  |___      |___     |___      |___      |___    |___    |___      |
  ___  |___      |___     |___      |___      |___    |___    |___      |
-------+---------+--------+---------+---------+-------+-------+---------|
TOTALS |     136 |   2.56 | 20.8000 |  1328.0 | 936.0 | 761.0 |  4.5255 |
ISOKINETIC RESULTS                                                  CALCULATED RESULTS FOR SAMPLE # --  S0929095AM5
  nt:  CRF       Updated  9/23/88  Performed by:      J.MILLS
   e:  9/29/88   Printed  10/03/88 Test No./Type:     S0925095AM5    Isokineticity                           % I        =   103.6
Sample Location:  STACK            Start/Stop Time:   0955-1055      Metered Sample Gas Volume  (scf)        V(m std) =   49.81
                                                                                                (scm)        V(m std) =   1.411
PARAMETER                          SYMBOL    VALUE                   Stack Gas Flow, std cond.  (dscfm)      Q(s)     =    1210
                                             (calc.)                                 std cond.  (dscm/min)Q(s)     =    34.3
Nozzle Diameter, Actual (in)       N(d)        0.357                                 actual     (acfm)       Q(a)     =    2288
Pitot Tube Correction Factor       C(p)        0.84                                  actual     (acm/min)    Q(a)     =    64.8
Gas Meter Correction Factor        (alpha)        1                  Particulate Loading,  dry  (gr/dscf)    C(s std) =  0.0165
Stack (Duct) Dimensions (in):                                                        @ 7% O2(gr/dscf)    C(s std) =  0.0253
        Radius (if round)          R              7                                  @ 7% O2(mg/dscm)    C(s std) =      58
        Length (if rectangular)    L         ----                    Particulate Emission Rate  (lb/hr)      E(s)     =   0.171
        Width (if rectangular)     W         ----                                               (kg/hr)      E(s)     =   0.078
Area of Stack (sq ft)              A(s)      (1.06901 )            ------------------------------------------------------------
                                                                     Stack Gas Water Vapor Proportion        B(wo)    =   0.375
# of Sample Points                 #             12                  Molecular Weight of Stack Gas, Dry      M(d)     =   29.79
Total Sampling Time (min)          (theta)   (  60.00 )                                             Wet      M(s)     =   25.37
Barometric Pressure (in Hg)        P(b)          30                  Stack Pressure, absolute (in Hg)        P(s)     =   29.99
Stack Pressure (in H2O)            P(stack)   -0.08                  Average Stack Velocity (ft/sec)         V(s avg) =    35.7
Gas Meter Initial Reading (cu ft)            126.813
Gas Meter Final Reading (cu ft)              179.539
Net Gas Sample Volume (cu ft)      V(m)      (  52.73 )

Vol of Liquid Collected (ml)       Vl(c)      634.41
Vol of Liq @ Std. Conds. (scf)     V(w std)  ( 29.862 )
Wt. of Filter Particulate (gm)                0.0333
   of Probe Wash Particulate (gm)              0.02
   of Combined Particulate (gm)    M(n)      ( 0.0533 )

O2  Concentration (by CEM)         %           11.87
CO2 Concentration (by CEM)         %             8.2
CO  Concentration (by CEM)         %               0
N2  Concentration (by diff.)       %         (  79.93 )

-----------------------------------------------------------------
Sample : dClock  :Velocity: Orifice :  Stack  :    Gas  Meter   :SQRT(dP) :FIELD DATA AVERAGES FOR SAMPLE # --  S0929095AM5
 Point :  Time   :Head, dP:Meter,dH :  Temp   :   Temp  (degF)  :         :
       :  (min)  :(in H2O):(in H2O) : (degF)  :    in   :  out  :         :Velocity Head          ("wc)      dP(avg)  =   0.300
-------+---------+--------+---------+---------+---------+-------+---------:
     1 :       5 :    0.3 :    2.46 :     166 :      80 :    78 :  0.5477 :Orifice Meter Reading  ("wc)      dH(avg)  =   2.460
     2 :       5 :    0.3 :    2.46 :     166 :     100 :    79 :  0.5477 :
     3 :       5 :    0.3 :    2.46 :     166 :     110 :    82 :  0.5477 :Stack Temperature      (deg F)    T(s avg) =   166.0
     4 :       5 :    0.3 :    2.46 :     166 :     117 :    84 :  0.5477 :                       (deg C)    T(s avg) =    74.4
     5 :       5 :    0.3 :    2.46 :     166 :     120 :    86 :  0.5477 :
     6 :       5 :    0.3 :    2.46 :     166 :     124 :    89 :  0.5477 :Meter Temperature      (deg F)    T(m avg) =   103.5
     1 :       5 :    0.3 :    2.46 :     166 :     125 :    91 :  0.5477 :                       (deg C)    T(m avg) =    39.7
     2 :       5 :    0.3 :    2.46 :     166 :     126 :    93 :  0.5477 :
     3 :       5 :    0.3 :    2.46 :     166 :     128 :    95 :  0.5477 :Root-Mean-Square dP    ("wc)      SQRT(dP) =   0.548
     4 :       5 :    0.3 :    2.46 :     165 :     129 :    96 :  0.5477 :
     5 :       5 :    0.3 :    2.46 :     166 :     129 :    97 :  0.5477 :
     6 :       5 :    0.3 :    2.46 :     166 :     129 :    98 :  0.5477 :
  ---  :---      :---     :---      :---      :---      :---    :---      :
  ---  :---      :---     :---      :---      :---      :---    :---      :
     . :---      :---     :---      :---      :---      :---    :---      :
  ---  :---      :---     :---      :---      :---      :---    :---      :
  ---  :---      :---     :---      :---      :---      :---    :---      :
  ---  :---      :---     :---      :---      :---      :---    :---      :
  ---  :---      :---     :---      :---      :---      :---    :---      :
-------+---------+--------+---------+---------+---------+-------+---------:
TOTALS :      60 :   3.60 : 29.5200 :  1992.0 :  1417.0 :1068.0 :  6.5727 :
```

APPENDIX D

VOST GC/FID ANALYSIS PROCEDURE

CRF Standard Operating Procedure for Analyzing VOST Tubes

1. Apparatus

A. Thermal Desorption Unit

The thermal desorption unit for inside/inside VOST stainless steel cartridges, (NuTech desorbtion unit with NuTech 320 controller) is capable of thermally desorbing the sorbent resin tubes. It is also capable of heating the tubes to 180± 10°C with flow of interference-free nitrogen or helium through the tubes.

B. Purge-and-Trap Unit

The purge - and - trap unit (Tekmar) consists of three separate pieces of equipment; the sample purger, trap, and the desorber. It should be capable of meeting all requirements of Method 5030 (sw 846, 2nd Ed.) for analysis of purgeable organic compounds from water.

C. GC/FID System

The Hewlett Packard 5880A Series gas chromatograph is equipped with a flame ionization detector (F.I.D.). The column used is a fused silica capillary gas chromatographic column (DB-624 30m x 0.53mm I.D. x 3µLm film thickness).

2. Procedure for Thermal Desorption of VOST Tubes

The VOST tubes are logged in the VOST record book when they are brought into the lab, by tube number and sample identifier number. Then the following steps are executed:

1. The caps are taken off the S.S. replica I/I glass design tubes (fabricated locally and field tested at the CRF). Internal standards(s) are added, typically 0.3µg of each compound in methanol solution at 0.1mg/ml.

2. Reducing unions (1/4" to 1/16" SS) are placed on the tubes plus 1/16" connecting tubing.

3. The VOST tubes are connected to the NuTech carrier lines for desorb gas flow in the opposite direction sample was taken, and checked for tightness, while NuTech thermal desorption unit (TDU) valve is in desorb position.

4. Then the VOST tubes are placed in the NuTech TDU and heated to 180°C± 10°C with interference-free helium through the tubes at 40ml/min.

5. VOST tubes are desorbed and purged for fifteen (15) minutes through the sparger onto the Tekmar chemical trap.

6. When the Tekmar reaches the desorb cycle the NuTech TDU valve is switched to the vent position and allowed to vent for forty five (45) minutes at 100 ml/min for cleaning purposes. Water in the sparger is drawn off, discarded, and replaced with 5.0ml of fresh cold tap water.

7. During desorbtion and cleaning period, samples are being analyzed by FID GC, and the fresh water in the sparger is being pre-purged in preparation for the next analytical run.

3. Apparatus Setpoints

A. Thermal Desportion Unit (NuTech with 320 NuTech controller)

The thermal desorption unit consist of three main heating zones; the valve, lines, and desorber, all of which are maintained at 180°C± 10°C. There is a helium flow of 40 ml/min when in desorb cycle and flow of 100 ml/min when in vent cycle.

B. Tekmar Purge and Trap Unit

The purge and trap consists of a series of automatic steps.

1. Standby -	During this step the Tekmar chemical trap is allowed to cool to 30°C.
2. Purge ready -	The Tekmar chemical trap at 30°C is ready to start purge of the VOST tubes in the thermal desorption unit onto the Tekmar chemical trap.
3. Purge -	During this cycle, the VOST tubes are purged for fifteen (15) minutes with 40 ml/min of helium gas through the sparger, onto the Tekmar chemical trap. The purger or sparger holds five mls of interference-free water.
4. Desorb preheat -	The Tekmar chemical trap is preheated to 100°C, taking about fifteen seconds to reach temperature.
5. Desorb -	For four minutes at 180°C the Tekmar trap is desorbed onto the G.C. column with flow rate of 5 mls/min of organic free helium.

6. Bake - For seven minutes at 215°C and 40 mls/min the Tekmar chemical trap is vented out the back of the Tekmar for cleaning purposes.

C. GC/FID System

Gas chromatograph: The Hewlett Packard 5880 series chromatograph is temperature programmed to separate the analytes which are quantitated with a flame ionization detector (240°C) using multilevel external standardization (ESTD). Oven temperature is held at 35°C for six minutes, then increased to 140°C at 4°C/min, then held for ten minutes. Interference-free helium carrier gas is set at 5 mls/min. Prior to analysis, every sample is spiked with internal standard and surrogate compounds. These compounds may simulate the behavior of compounds of interest and confirm that acceptable recoveries are being achieved on every sample. The results of internal standards and surrogate recoveries (%) are reported with the sample results.

4. External Standard Calibration Procedure

For all analytes of interest, e.g. Table 1, prepare calibration standards at a minimum of three (3) concentration levels by making appropriate dilutions of a stock standard at 1.0µg/µL methanol. The concentration levels might be, e.g. 3.0, 0.3, and .03 total µg per 3 µL injected.

Each calibration standard is injected onto the exit end of the VOST tubes (3µL injection), 0.5mL of water is added in an effort to mimic flue gas samples, and the analysis is conducted normally. Tabulate response factor against amount injected for each target analyte.

$$\text{Response factor} = \frac{\text{Mass injected } (\mu g)}{\text{Peak height}}$$

1) The ratio of amount injected (µg) to response (PkHt) is defined as the response factor RF, which is calculated for each analyte at each standard concentration. If the percent relative standard deviation (%RSD) of the response factors for each analyte, internal standard, and surrogate is less than 20% over the working range, linearity can be assumed. If linearity cannot be established, recalibration at three levels must be performed.

2) The working response factors must be verified on each working day by the analysis of one or more calibration standards. If the response factor for any target analyte varies from the predicted response factor by more than ± 30%, the system must be recalibrated at that level.

$$\text{Percent Difference} \quad \frac{R_1 - R_2}{R_1} \times 100$$

Where: R_1 = Response factor from preceeding analysis
R_2 = Response factor from succeeding analyses.

Table 1

Compound	Abbrev.
1,1-Dichloroethylene	1,1-DCEENE
Methylene Chloride	M/C
t-1,2-Dichloroethylene	t-1,2-DCEENE
HEXANE	Hexane
1,1-Dichloroethane	1,1-DCEANE
CHLOROFORM	Chloroform
1,1,1-Trichloroethane	1,1,1-TCEANE
Carbon Tetrachloride	CCL4
BENZENE	Benzene
1,2-Dichloroethane	1,2-DCEANE
Trichloroethylene	CL3-EENE
1,2-Dichloropropane	1,2-DCPRANE
Bromodichloromethane	BDCM
t-1,3-Dichloropropylene	t-1,3-DCPENE
TOLUENE	Toluene
OCTANE	Octane
c-1,3-Dichloropropylene	C-1,3-DCENE
1,1,2-Trichloroethane	1,1,2-TCEANE
Tetrachloroethylene	CL4-EENE
Chlorobenzene	CL-BZ
Ethylbenzene	Et-BZ
BROMOFORM	Bromoform
4-Bromofluorobenzene	4-BFB
1,1,2,2-Tetrachloroethane	CL-EANE
1,3-Dichlorobenzene	1,3-DCBZ
1,4-Dichlorobenzene	1,4-DCBZ
1,2-Dichlorobenzene	1,2-DCBZ

Daily Performance Checks

1) Calibrate the system (midlevel standard) immediately prior to conducting any analyses. A midlevel standard must also be injected at the end of the analysis sequence. The response factor for each analyte to be quantitated must not exceed 30% difference when compared to the initial standard of the analysis sequence. If this criteria is exceeded, inspect the G.C. system to determine the cause and perform whatever maintenance is necessary before recalibrating and proceeding with subsequent sample analysis.

2) Verify retention time windows (update daily) for each analyte: retention times for daily calibration must be within ± .08 min. of prior calibration standards for all target analytes.

3) Tentative identification of an analyte occurs when a peak from a sample falls within the daily retention time window.

4) Validation of GC system qualitative performance: use the daily retention time windows for each analyte to evaluate this criterion. If any of the standards falls outside its daily retention time window, the system is out of control. Determine the cause of the problem and correct the problem.

5. Quality Control

1) The quality control program consist of an initial demonstration of laboratory capability and an ongoing analysis of VOST field spike tube pairs, to evaluate and document data quality. The laboratory will maintain records to document the quality of the data generated. Ongoing data quality checks are compared with established performance criteria to determine if the results of analyses meet the DQO of the applicable burn series test plan for analytes of interest as well as surrogate and internal standard compounds. When results of field spikes indicate atypical method performance, a quality control check standard (Supelco) must be analyzed to confirm that the measurements were performed in an in-control mode of operation.

2) Before processing any samples, the analyst should demonstrate through the analysis of VOST tubes, that interferences from the analytical system, glassware, SS VOST tubes, and OFW are under control. Blank samples should be treated in the same manner as samples.

3) Consistent with the applicable burn series test plan/QAPP, for each analytical batch, (up to 20 samples) a blank, field spike and a field spike duplicate must be analyzed. The blank and spiked samples must be carried through all stages of analysis. Field spike solutions will be prepared independently of calibration standards as dictated by the applicable test plan/QAPP.

4) The experience of the analyst performing gas chromatography is invaluable to the success of the analysis. Each day that analysis is performed, the daily calibration sample should be evaluated to determine if the chromatographic system is operating properly. Questions that should be asked are: Do the peaks look normal?; Is the response obtained comparable to the response from previous calibrations?
Careful examination of the standards chromatogram can indicate whether the column is still good, the desorbtion lines are leaking, 6 port valve clogged, etc... If any major changes are made to the analytical system (e.g. column changed), recalibration of the system must take place.

Required Instrument QC

1) Require that the % RSD vary by <20% when comparing calibration factors to determine if the 3 point calibration is linear.

2) ± 30% difference when comparing daily response of a given analyte versus the initial response. If the limit is exceeded, you must recalibrate.

3) Establishment of retention time windows, and that all succeeding standards in an analysis sequence must fall within the daily retention time window established by the first standard of the sequence.

To establish the ability to generate acceptable accuracy and precision, the analyst must perform the following operation.

1) A quality (QC) check sample concentrate is required containing each analyte of interest. The QC check sample concentrate may be prepared from pure standard materials or purchased as certified solutions.

If prepared by the laboratory, the QC check sample concentrate must be made using stock standards prepared independently from those used for calibration.

The concentration of the QC check sample concentrate is highly dependent upon the analytes being investigated. Prior to any analysis each pair of VOST tubes will be spiked with A/10 ISTD (0.3μg) of nonane and decane. Prior to any sample being taken each pair of
VOST tube will be spiked with 2 surrogate standards (4-Bromofluorobenzene and Octane).

Analysis of purgeable compounds in samples other than VOST, e.g., scrubber blowdown water, bottom ash, and primary waste feed; is accomplished using the P&T/GC-FID methods of this SOP coupled with sample preparation techniques found in Method 5030, SW 846-Test Methods for Evaluating Solid Waste, 3rd Ed., November 1986.